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1997 Changed to DowElanco Award for Excellence in Education
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1989	Changed to National Peanut Council Research and Education Award

ANNUAL MEETING PRESENTATIONS

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PRODUCTION TECHNOLOGY

BREEDING, BIOTECHNOLOGY, AND GENETICS I: DISEASE RESISTANCE

PLANT PATHOLOGY AND NEMATOLOGY I

GRADUATE STUDENT COMPETITION

PROCESSING AND UTILIZATION/HARVESTING, CURING, SHELLING, STORING, HANDLING

ECONOMICS I

BREEDING, BIOTECHNOLOGY, AND GENETICS II: VALUE ADDED TRAITS AND TOOLS FOR MANAGEMENT

PLANT PATHOLOGY AND NEMATOLOGY II

WEED SCIENCE

EXTENSION TECHNIQUES AND TECHNOLOGY/EDUCATION FOR EXCELLENCE (Sponsored by Bayer CropScience)

BREEDING, BIOTECHNOLOGY, AND GENETICS III: GERMPLASM RESOURCES

ECONOMICS II

MYCOTOXINS/PHYSIOLOGY AND SEED TECHNOLOGY

ENTOMOLOGY

WORKSHOP: "STRIVING FOR EXCELLENCE IN PEANUT SCIENCE"

2:30 Introduction.....**Michael Franke**
J. Leek Associates, Brownfield, TX

2:35 A Historical Perspective..... **Harold Pattee**
Retired, USDA-ARS, NC State University, Raleigh, NC

2:50 The Editor's Role.....**Thomas Stalker**
Crop Science Dept., NC State University, Raleigh, NC

3:05 The Associate Editor/Reviewer ..... **Tim Brenneman**
Coastal Plain Exp. Stn., Tifton, GA

3:20 The Electronic Age ..... **Chris Butts**
National Peanut Laboratory, Dawson, GA

3:35 Open Discussion

POSTER SESSION I

POSTER SESSION II

PRODUCTION TECHNOLOGY

Impact of Planting Date on Production of Three Recently Released Virginia-type Peanut Cultivars. J. FAIRCLOTH*, Crop, Soil and Environmental Sciences, Virginia Tech, Suffolk, VA 23437; D. JORDAN, Department of Crop Science, North Carolina State University, Raleigh, NC, 27695; P PHIPPS, Department of Plant Pathology and Weed Science, Virginia Tech, Suffolk, VA 23437; and D. COKER, Crop, Soil and Environmental Sciences, Virginia Tech, Suffolk, VA 23437.

In 2004, research trials were conducted in Suffolk, VA at the Tidewater Agricultural Research and Extension Center and in Lewiston, NC at the Peanut Belt Research Station to assess the impact of planting date on the productivity of three newly released virginia type peanut cultivars. The newly released cultivars included were Phillips (N-98003), Brantley (N-00090 OL), and CHAMPS (VT 9506102). Perry and Gregory were utilized as standards. Each cultivar was planted on each of three periods of time (5-10 May, 20-25 May, and June 5-10). Measurements of plant population, yield, grade, and Tomato Spotted Wilt Virus (TSWV) and Cylindrocladium black rot (CBR) incidence were recorded. There was little difference in yield of cultivars planted on the first two planting dates but the yield of cultivars planted on the last planting date was significantly reduced at both locations. Disease incidence (TSWV and CBR) was highest at both locations across cultivars on the first planting date. CHAMPS displayed the lowest incidence of disease at both locations. Inconsistent grade differences were observed across planting dates regardless of cultivar. These results support earlier findings on the effect of planting date on disease incidence (especially TSWV) where early planting resulted in significantly higher TSWV incidence. Based on this one year of data at two locations, there appears to be a narrow (10-25 d) window of opportunity available for planting peanut where TSWV will be minimized without sacrificing yield potential in the Virginia / North Carolina region.

Peanut Yield Response to Reduced Supplemental Irrigation Capacity on Three Tillage Systems in the Southeastern Coastal Plain. W.H. FAIRCLOTH*, M.C. LAMB, D.L. ROWLAND, and R.C. NUTI. USDA/ARS, National Peanut Research Laboratory, Dawson, GA 39842.

Interstate litigation regarding water rights has focused much attention on agricultural water use in the Southeast. Moratoria on agricultural withdrawal permits in certain watersheds and voluntary auctioning of agricultural water rights have occurred, thus the future expansion of irrigated acreage may be limited unless alternative methods of irrigation are adopted or current practices are made more efficient. The interaction between reduced irrigation capacity and tillage, including the possible conservation of water with reduced tillage systems, is of vital interest to peanut growers. A factorial arrangement of three tillage systems (conventional, wide-strip, and narrow-strip) and four supplemental irrigation levels (100%, 66%, 33%, and 0% of a recommended amount) with three replications is being monitored for

yield and overall economic viability in a corn-peanut-cotton rotation. Supplemental irrigation is based on Irrigator Pro®, an irrigation decision support system that uses atmospheric evapotranspiration and plant growth stage as a trigger. The study is located at the Hooks-Hanner Environmental Resource Center, Dawson, GA, on a Greenville sandy loam soil. With the exception of irrigation and tillage, plots were managed using best management practices according to UGA Extension recommendations. The first three years will be discussed (2002-2004). Mixed Models analysis at the 0.05 level revealed a significant year effect ($P<0.001$), therefore data will be discussed by crop year. First year (2002) peanut yields were significant for the main effects of tillage and irrigation and yields ranged from 3030 kg ha^{-1} to 5553 kg ha^{-1}. Narrow-strip tilled peanuts irrigated the full amount possible (100%) yielded 5553 kg ha^{-1}. Decreasing irrigation capacity by one-third to 66% of a recommended amount did not significantly decrease yield. As irrigation was further decreased from 66% to 33%, yield was decreased 570 kg ha^{-1}. The dryland (0%) peanuts averaged 3479 kg ha^{-1}, a 1284 kg decrease in yield from the 33% level. Narrow-strip tilled peanuts yielded 401 kg ha^{-1} greater than wide-strip tilled peanuts. No differences were detected between either of the conservation tillage systems and the conventional tillage system. Irrigation level was not significant in 2003 due to excellent growing conditions, as yields ranged from 3532 kg ha^{-1} to 4633 kg ha^{-1}. Tillage was significant for the 2003 growing season and conventional tillage had 9% and 11% higher yield than either the narrow or wide-strip tillage systems, respectively. An irrigation by tillage interaction was detected for the 66% supplemental irrigation level, but not at the other irrigation levels. Within the 66% level, conventional tillage yield was 20% greater than the either of the conservation tillage systems. An irrigation effect only was detected in the 2004 growing season. No significant differences were shown between the 100%, 66%, and 33% supplement irrigation levels. Dryland peanuts yielded 495 kg less than the 100% irrigation level. No differences in tillage systems were detected. In summary, the effect of reduced supplemental irrigation was highly dependent on rainfall. Crop years 2003 and 2004 were relatively wet and in those seasons, irrigation could have been reduced by as much as 33% and yields sustained. In a drier season such as 2002, irrigation could have been reduced to the 66% level and yield sustained. Tillage effects were not consistent through time, and the anticipated interaction of tillage and reduced irrigation capacity was only detected for a single season and irrigation level. This study will continue to be monitored through 2010 to examine long range weather conditions and the effects of time on tillage response.

Conservation Tillage, Winter Cover Crop, Peanut Variety, and Fungicide Rate on Peanut Yield. R.B. SORENSEN*, USDA-ARS-National Peanut Research Laboratory, PO Box 509, 1011 Forrester Dr. SE, Dawson, GA 39842; T.B. BRENNEMAN, University of Georgia, Dept. of Plant Pathology, P.O. Box 748, Tifton GA; M.C. LAMB, USDA-ARS-National Peanut Research Laboratory, PO Box 509, 1011 Forrester Dr. SE, Dawson, GA 39842.

Strip tillage with various crop covers in peanut (*Arachis hypogeae*, L.) production has not shown a clear yield advantage over conventional tillage. This study was conducted to determine pod yield and disease incidence between two tillage practices, five winter cover crops, three peanut varieties, and three fungicide rates. Conventional and strip tillage treatments were implemented on a Greenville sandy loam (fine, kaolinitic, thermic Rhodic Kandiudults) near Shellman, GA. Five winter cereal grain cover crops (strip tillage) and a no cover treatment were sprayed at full (1.0R), half (0.5R) and no (Zero) fungicide rates. Leaf spot (*Cercospora arachidicola*) and white mold (*Sclerotium rolfsii*) increased as fungicide rate decreased. Within peanut varieties, leaf spot decreased as fungicide increased, however, white mold incidence was the same for the 1.0R and 0.5R fungicide rate but increased at the Zero fungicide rate. Conventional tillage had more leaf spot than strip tillage. There was no leaf spot difference within winter crop covers. There was no difference in white mold incidence with tillage or winter cover crop. There was no yield difference with peanut variety. Pod yield was the same for the 1.0R and 0.5R fungicide rate (3867 kg ha^{-1}) but decreased at the Zero fungicide rate (2740 kg ha^{-1}). Pod yield was greater with conventional tillage and strip tillage with black oats (*Avena sativa*) (3706 kg ha^{-1}) compared with strip tillage of other winter crop cover treatments (3358 kg ha^{-1}). Conventional tillage had more disease and higher yield compared with strip tillage. The 0.5R fungicide rate had the same yield compared with the 1.0R fungicide rate implying a possible 50% savings on fungicide applications.

The Effect of Planting Pattern and Disease Management on Peanut Yield and Grade. R.C. NUTI*, W.H. FAIRCLOTH, C.T. BENNETT, J. DAVIDSON, USDA, ARS, National Peanut Research Laboratory, Dawson, GA 39842; and T.B. BRENNEMAN, University of Georgia, Tifton, GA 31793.

Peanut is typically sown in single or twin rows centered on 91 cm beds. A planter capable of sowing 8 rows of peanuts on a 182 cm bed was developed at NPRL. This planter spaces seed evenly in a diamond pattern in order to optimize plant spatial relationships. A diamond-pattern seed placement usually results in achieving ground cover 10 to 14 days sooner than peanuts planted in single or twin rows. This benefit will decrease soil moisture loss, the survivability of competitive plant species, and improve yield. Reducing early competition for resources between peanut plants may further contribute to earliness. Management of soil borne diseases in peanut may be affected by planting patterns. Three disease strategies were factored over single row, twin row, and diamond planting patterns, for a total of 9 treatments. The first disease strategy was on a 10 to 14 day schedule starting with three chlorothalanil applications followed by four tebuconazole applications. The second disease management strategy followed AUPnut using chlorothalanil when recommended during the first 49 DAP, tebuconazole between 50 and 100 DAP, and chlorothalanil after 101 DAP. The third disease management strategy incorporated AUPnut recommendations with minimum soil temperature to determine product selection for disease control from July until harvest.

Tebuconazole was selected when minimum soil temperature was below 21.1 C and above 23.8 C to target *Rhizoctonia solani* and *Sclerotium rolfsii*, which are more prevalent with lower and higher minimum soil temperatures, respectively. Chlorothalanil, which is a more affordable product, was selected to maintain suppression of *Cercospora arachidicola* and *Cercosporidium personatum* when minimum soil temperature was between 21.1 and 23.8 C. Replicated field experiments were conducted in 2002, 2003, and 2004 at two locations each year on Americus and Faceville soil types in Terrell county Georgia. Peanut cultivar 'Georgia Green' was sown at 124 kg/ha to establish single row, twin row, and diamond pattern plots establishing a uniform number of plants per linear unit of row. Acephate was applied in furrow at planting in all treatments because a system for delivering granular insecticides has not been incorporated with the diamond planter. A two-row KMC digger/inverter was modified in order to effectively handle peanuts evenly spread over a 182 cm bed for the diamond planted plots. Disease index, yield components, and grade are recorded.

Effect of Calcium Products on Virginia Peanut in Texas. T.A. BAUGHMAN*, W.J. GRICHAR, J.C. REED, JR., and W.G. CARTER, III. Texas A&M Research & Extension Center, Vernon and Beeville.

Field studies were established in Texas during the 2003 and 2004 growing seasons to evaluate the use of calcium on Virginia peanut. Five studies were conducted on producers' field in Terry and Wilbarger County. Treatments included untreated (no calcium), one application of gypsum at 1500 lbs/A (750 lbs/A on 20" band), two applications of N-Cal at 12 gallons per acre each applied in a broadcast spray, and one or two applications N-Cal applied through the center pivot. Two studies were conducted at the Western Peanut Growers Farm near Denver City and the Yoakum Experiment Station near Yoakum. Treatments included untreated (no calcium), one application of gypsum at 1500 lbs/A (750 lbs/A on 20" band), and two applications of N-Cal at 12 gallons per acre each applied in a broadcast spray. The studies also include three Virginia varieties: Jupiter, NC7, and VC2. Neither yields nor grades were affected by any of the calcium applications in the first study. Yield was not affected in 3 or 4 trials in the second study and grade was not affected in any of the trials. Yield was reduced by the N-Cal spray treatment in at Yoakum in 2004. This was most likely due to excessive leaf burn from the sprayed application of N-Cal. There were no differences in yield or grade between Virginia varieties in two trials. NC7 yielded higher than VC2 or Jupiter in two of the trials. VC2 had a higher grade than NC7 and Jupiter in one trial and NC7 in another.

BREEDING, BIOTECHNOLOGY, AND GENETICS I: DISEASE RESISTANCE

Comparison of Agronomic Traits and Disease Reactions Between High-Oleic Backcross-Derived Lines and Their Normal-Oleic Recurrent Parents. T.G. ISLEIB*, S.R. MILLA, S.C. COPELAND, and J.B. GRAEBER. Dept. of Crop Science, Box 7629, N.C. State Univ., Raleigh, NC 27695-7629.

The high-oleic trait extends the shelf-life of peanut (*Arachis hypogaea* L.) products and is therefore a desirable trait to include in new cultivars. Growers, shellers, and processors of peanuts often ask if the high-oleic trait affects other characters. Lines derived by backcrossing the Florida high-oleic gene from the spanish line F435 into virginia-type cultivars were evaluated in yield trials from 1999 through 2004 and in disease field trials for early leafspot (ELS) caused by *Cercospora arachidicola* Hori, Cylindrocladium black rot (CBR) caused by *C. parasiticum* Crous, M.J. Wingfield, & Alfenas, Sclerotinia blight (SB) caused by *S. minor* Jagger, and the syndrome caused by tomato spotted wilt virus (TSWV), a *Tospovirus* of the family *Bunyaviridae* from 2000 through 2004. Data collected on the factorial set of normal- and high-oleic lines were analyzed to separate the effects of the oleate level, background genotype, and oleate-by-background interaction. Averaged across background genotypes, the high-oleic backcross-derived lines had fewer farmer stock fancy pods (80.7 vs. 83.4%, $P<0.01$), fewer and darker jumbo pods (content 46.4 vs. 49.0%, $P<0.01$, hull brightness 45.0 vs. 45.5 Hunter L score, $P<0.05$), lower 100-seed weight (88.3 vs. 89.7 g, $P<0.05$), greater sound mature kernel content (70.1 vs. 69.1%, $P<0.01$), greater sound split content (3.2 vs. 2.8%, $P<0.01$), greater meat content (72.3 vs. 71.6%, $P<0.01$), and greater support price (18.27 vs. 18.07¢ lb^{-1}, $P<0.01$). All of these shifts were consistent with those expected when introgressing genes from a spanish parent into a virginia-type cultivar. High-oleic backcross-derived lines and their recurrent parents did not differ for defoliation score or pod yield in the absence of chemical leafspot control nor for incidence of CBR, SB, or TSWV. There were significant differences between specific backcross-derived lines and their respective recurrent parents for many traits that did not show an average effect of the high-oleic trait, and there was significant variation among high-oleic lines in a common genetic background for most agronomic traits. Variation among background genotypes was significant for all traits except yield, value per acre, and SB incidence. The high-oleic trait does not appear to have a consistent effect on agronomic traits or reaction to the four diseases most important in the Virginia-Carolina production area.

Identification of a Simple Sequence Repeat (SSR) Marker in Cultivated Peanut (*Arachis hypogaea* L.) Potentially Associated with Sclerotinia Blight Resistance. K.D. CHENAULT*, USDA-ARS, Stillwater, OK 74075; and A. MAAS, Department of Plant and Soil Sciences, Oklahoma State University, Stillwater, OK 74078.

The production of cultivated peanut, an important agronomic crop throughout the United States and the world, is consistently threatened

by various diseases and pests. Although information on the variability of morphological traits associated with disease resistance is plentiful, few molecular markers associated with such resistance have been reported. The identification of such markers would greatly assist peanut geneticists in selecting genotypes to be used in breeding programs. The objective of this work was to use simple sequence repeat (SSR) primers previously reported for peanut to identify a molecular marker associated with resistance to the fungus *Sclerotina minor* Jagger. Total peanut genomic DNA was extracted from 21 cultivated peanut genotypes and subjected to PCR using different SSR primer pairs. As expected, most primer pairs revealed little or no polymorphism among the genotypes tested. However, one primer pair consistently produced a banding pattern distinctly different for those genotypes with demonstrated resistance to *S. minor* compared to that generated for genotypes with demonstrated susceptibility. The identification of a potential marker for *S. minor* resistance in peanut may prove to be extremely useful for screening germplasm collections.

Marker-Assisted Selection for Nematode Resistance. Y. CHU, P. OZIAS-AKINS*, Department of Horticulture, The University of Georgia Tifton Campus, Tifton, GA 31793-0748; C.C. HOLBROOK, P. TIMPER, USDA-ARS, Coastal Plain Experiment Station, Tifton, GA 31793-0748.

The most effective nematode resistance in cultivated peanut (*Arachis hypogaea* L.) has been introduced from the wild diploid relative, *A. cardenasii*. Two nematode-resistant cultivars, COAN and NemaTAM, have been released from the Texas breeding program. Although these cultivars have a high level of nematode resistance, they do not have resistance to tomato spotted wilt virus (TSWV) and therefore cannot be grown in the southeastern US. Crosses have been made with COAN or NemaTAM in order to introduce nematode resistance genes into lines that also have a high level of TSWV resistance. Screening for nematode resistance can be carried out by inoculation in the greenhouse, but only on a limited number of lines each year. Screening could be accelerated by using molecular markers for selection. Published markers have been tested for their ability to track chromosomal segments carrying nematode resistance genes in our crosses. A rapid and cost-effective screening protocol has been developed and will be described. Amplified fragment length polymorphism (AFLP) markers that are present in advanced-generation, nematode-resistant lines have been identified. Association of these markers with nematode resistance is being verified and linked markers will be converted to simpler PCR-based markers.

Relationship of Resistance to Tomato Spotted Wilt to Yield and Grade Factors. D.W. GORBET*, B.L. TILLMAN, University of Florida, NFREC, Marianna, FL 32446, A.K. CULBREATH, J.W. TODD, University of Georgia, CPES, Tifton, GA 31793 and R.N. PITTMAN, USDA-ARS, Griffin, GA 30223.

Tomato spotted wilt, caused by thrips-vectored tomato spotted wilt virus

(TSWV), is a serious problem for peanut production in the SE USA. The single most important factor in management of TSWV is cultivar resistance. Multiple field tests were evaluated at Marianna and Gainesville, Florida, in 2003-2004, to evaluate cultivars and breeding lines for resistance to TSWV under various disease pressure situations. Marianna is a high-pressure site and Gainesville has relatively low pressure. Data analyses indicated a highly-significant, strong negative relationship between disease severity and pod yields (r= -0.62 to -0.95) at Marianna. This relationship ranged from not significant to r=0.60 ($P \geq 0.05$) at Gainesville. No consistent pattern was apparent on TSWV ratings and TSMK (total sound mature kernels), but a significant negative relationship was noted in some Marianna tests. A consistent strong relationship was obtained for TSWV severity and symptoms for TSWV on seed/testa. TSWV severity rating relationships to other grade factors were less apparent. Location, planting date, and relative degree of resistance in a test impacted results. Genotypes with excellent TSWV resistance were identified, including AP-3 and other breeding lines.

Resistance to Sclerotinia Blight in Peanut by Introduction of a Barley Oxalate Oxidase Gene. E.A. GRABAU*, J.L. HAMPTON, D.M. LIVINGSTONE, Department of Plant Pathology, Physiology and Weed Science, Virginia Tech, Blacksburg, Virginia 24061; D.E. PARTRIDGE, P.M. PHIPPS, Tidewater Agricultural Research and Extension Center, Suffolk, Virginia 23437.

The production of oxalic acid has been recognized as a pathogenicity factor for fungal pathogens such as *Sclerotinia minor*, the causal agent of Sclerotinia blight, a devastating disease of peanut. To counteract the effects of oxalic acid and to reduce fungal infection, we have introduced the gene for an oxalate oxidase from barley into regenerable peanut tissue culture of three Virginia-type peanut cultivars (Perry, Wilson, and NC-7). Regenerated transgenic plants expressing the oxalate oxidase gene showed reduced lesion size in response to direct applications of oxalic acid and inoculations with *S. minor* in detached leaflet bioassays. Plant selections were made through the T_1 generation in the greenhouse based on detached leaf assays for gene expression and resistance. Seeds in the T_2 generation from 55 transgenic lines were produced in the greenhouse for field testing in the summer of 2004. Pre-germinated seeds from each greenhouse plant were planted by hand in single rows spaced 36 inches apart and a seed spacing of 6 inches. Entries included 28 non-transformed parent varieties and border rows of VA 98R between entries. The field site was naturally infested with *S. minor* and had a history of Sclerotinia blight of peanut in 2-yr rotations with cotton. Disease appeared first in the non-transformed parent varieties and caused severe damage by harvest. Only low to trace levels of disease were detected in transgenic lines. These results provided confirmation of the functionality of the oxalate oxidase gene in providing disease resistance against Sclerotinia blight of peanut.

Microarray Analysis of Differentially Expressed Genes Involved in Resistance Responses to Late Leaf Spot Disease Caused by *Cercosporidium personatum* in Peanut. B.Z. GUO*, USDA-ARS, Crop protection and Management Research Unit, Tifton, GA 31793; M. LUO, D. LEE, Department of Crop and Soil Sciences, University of Georgia, Tifton, GA 31793; P. DANG, M.G. BAUSHER, USDA-ARS, U.S. Horticultural Research Laboratory, Ft. Pierce, FL 34945; and C.C. HOLBROOK, USDA-ARS, Crop Genetics and Breeding Research Unit, Tifton, GA 31793.

Late leaf spot disease caused by *Cercosporidium personatum* is one of the most destructive foliar diseases of peanut worldwide. The objective of this research was to identify resistance genes in response to leaf spot disease using miccroarray and real-time PCR. To identify transcripts involved in disease resistance, we studied the gene expression profiles in two peanut genotypes, resistant or susceptible to leaf spot disease, using cDNA microarray containing 384 unigenes selected from two EST (expressed sequenced tag) cDNA libraries challenged by abiotic and biotic stresses. A total of 112 spots representing 56 genes in several functional categories were detected as up-regulated genes (Log2 ratio>1). Seventeen of the top 20 genes, each matching gene with known function in GenBank, were selected for validation of their expression levels using real-time PCR. These two peanut genotypes were also used to study the functional analysis of these genes and possible link of these genes to the disease resistance trait. Microarray technology and real-time PCR were used for comparison of gene expression. The selected genes identified by microarray analysis were validated by real-time PCR. These genes were more highly expressed in the resistant genotype as a result of response to the challenge of *C. personatum* than in the susceptible genotype. Further investigations are needed to characterize each of these genes in disease resistance. Gene probes could then be developed for application in breeding programs for marker-assisted selection.

Developing Peanut Cultivars with Genetic Resistance to Early Leafspot. S.P. TALLURY*, T.G. ISLEIB and H.T. STALKER. Department of Crop Science, North Carolina State University, Raleigh, NC 27695-7629.

Early leafspot caused by *Cercospora arachidicola* Hori is an endemic fungal disease in the Virginia-Carolina peanut production area. Chemical control is the main option for growers to manage the disease and reap stable yields. However, chemical control is costly and occasionally is delayed due to adverse weather conditions resulting in significant yield losses. The objective of our study was to develop peanut cultivars with genetic resistance to early leafspot. We have used tetraploid germplasm lines derived from an interspecific cross between *Arachis hypogaea* L. and *A.cardenasii* Krapov. & Gregory as sources of genes for leafspot resistance. Several agronomically improved advanced breeding lines were selected for leafspot evaluation in field tests. In the summer of 2004, 26 selected breeding lines were evaluated independently in side-by-side spray-controlled and unsprayed tests along with 10 commercially grown susceptible virginia-type cultivar

checks and 7 resistant checks at the Peanut Belt Research Station in Lewiston, NC. The unsprayed mean defoliation score of the selections was 4.59±0.12 (range 3.30 to 7.85) compared to 6.94±0.06 (range 6.23 to 7.59) and 4.42±0.07 (range 3.90 to 4.91) for the virginia cultivars and resistant checks, respectively. The mean yield of the selections was 2634±120 lb/A whereas the cultivars yielded 2381±65 lb/A and the mean yield of the resistant checks was 2602±70 lb/A. Additionally, the selections consistently and significantly out-yielded both the cultivars and the resistant checks in tests with chemical sprays. These results indicate that developing cultivars with genetic resistance to early leafspot in the V-C area for commercial production is not just a possibility but is practical.

PLANT PATHOLOGY AND NEMATOLOGY I

Mapping of *Sclerotinia minor* Populations with Global Positioning Systems. J.E. HOLLOWELL*, D.L. SMITH, and B.B. SHEW. Dept. of Plant Pathology, NC State University, Raleigh, NC 27695.

Sclerotinia minor causes serious damage on peanut in North Carolina, so understanding the ecology and variability of the pathogen population is critical for continued effective disease management. In northeastern North Carolina, *Sclerotinia minor* isolates were obtained from fields with a history of Sclerotinia blight. Isolates were collected from apothecia, peanut debris, and winter annual weed species found in fallow peanut fields. A global positioning system (GPS) instrument was used to map the collection locations and the time of collections was recorded. Each isolate was paired with testers on Diana Sermons Medium to determine its mycelial compatibility group (MCG). The testers were isolates representing MCGs from earlier weed and peanut collections. Relationships between collection location, collection timing, and hosts were examined to identify any correlations between overwintering hosts and pathogen variability. The nine MCGs identified in these collections were not specifically associated with host species which suggested local heterogenous populations. The infection of multiple hosts during winter fallow may contribute to overall population diversity and survival.

Management of Sclerotinia Blight with the Biological Control Agent *Coniothyrium minitans* and Its Sensitivity to Nine Pesticides Commonly Used in Peanut Production. D.E. PARTRIDGE*, T.B. SUTTON, Department of Plant Pathology, and D.L. JORDAN, Department of Crop Sciences, North Carolina State University, Raleigh, NC 27695.

Sclerotinia blight of peanut, caused by *Sclerotinia minor*, is an important disease in North Carolina. Sclerotia are the main overwintering propagules of *S. minor* and serve as the primary inoculum source for Sclerotinia blight. Recent field studies have shown that the biological control agent, *Coniothyrium minitans,* is able to infect sclerotia of *S. minor* and reduce disease in peanut when applied for consecutive years. However, various chemicals that are used in peanut production

may affect the activity of *C. minitans*. In this study nine pesticides commonly used in peanut production were evaluated for their effects on mycelial growth, spore germination, and mycoparasitic activity of *C. minitans* on *S. minor*. (EC_{50}) mycelial growth of *C. minitans* were <1 μg a.i. ml^{-1} for chlorothalonil, fluazinam, pyraclostrobin, tebuconazole, and flumioxazin. EC_{50} for spore germination of *C. minitans* were <1 μg a.i. ml^{-1} for chlorothalonil, fluazinam, pyraclostrobin, tebuconazole and flumioxazin, but >10 μg a.i. ml^{-1} for azoxystrobin, diclosulam, *S*-metolachlor, and pendimethalin. A modified soil plate technique was used to assess the pesticides for their effect on *C. minitans* infection of *S. minor*. *C. minitans* survived and infected sclerotia of *S. minor* in the presence of all nine pesticides, but mycoparasitic activity was reduced compared to the non-treated control by all pesticides but *S*-metolachlor. The ability of *C. minitans* to parasitize sclerotia of *S. minor* even in the presence of the nine pesticides demonstrates their compatibility with the biological control agent. However, high sensitivity of mycelial growth, spore germination and reduced mycoparasitic activity to the five fungicides and the herbicide flumioxazin indicates that *C. minitans* should not be applied during times in which there is a high risk of it contacting these pesticides before it becomes established in soil.

Yield Response of Selected Entries from Peanut Core Collection to Fungicide for Control of Sclerotinia Blight. J.P. DAMICONE* and W.D. SCRUGGS, Dept. of Entomology and Plant Pathology, Oklahoma State University, Stillwater, OK 74078; and C. HOLBROOK, USDA/ARS, Tifton, GA 31793.

The peanut core collection was screened for reaction to Sclerotinia blight in the field in 2001. Core entries with promising levels of partial resistance were evaluated in replicated field trials in 2002 and 2003. From these evaluations, ten core entries with the best combination of resistance and yield were compared in the field to seven reference cultivars in 2004. Entries (whole plots) received either two applications of the fungicide fluazinam at 0.78 lb/A, or no fungicide for Sclerotinia blight (split plots). Sclerotinia blight appeared early in the season and reached a final incidence of 60% in untreated plots of 'Okrun', a susceptible reference cultivar. Fluazinam reduced disease incidence and increased yields ($P<0.05$) for all of the reference cultivars except for Southwest Runner and Tamspan 90. Yield responses ranged from 1400 to 1500 lb/A for Georgia Green and Tamrun 96 to over 2100 lb/A for Okrun. For the core entries, fluazinam reduced disease incidence for only (PI no.) 497599, 274193, and 458619. Fluazinam did not increase yields for nine of the core entries (497318, 497429, 497599, 331324, 274193, 259796, 285538, 268659, and 468195). Yields of 485619 were increased by fluazinam ($P<0.05$), but the response was only 230 lb/A. Core entries 497429, 497599, and 268359 had yields similar to Tamspan 90. Entry 497429 had less that 5% disease and yields similar to Southwest Runner. The resistance of most of the core entries, selected for a low incidence of Sclerotinia blight, was verified by the lack of a yield response to fluazinam.

Screening Cultivars and Advanced Germplasm for Multiple Disease Resistance. T.B. BRENNEMAN*, and A.K. CULBREATH, Department of Plant Pathology, University of Georgia, Tifton, GA 31794, and C.C. HOLBROOK, Crop Genetics and Breeding, USDA-ARS, Tifton, GA 31794.

Disease resistance is a high priority in peanut breeding programs. Over 120 runner and virginia genotypes from six programs were evaluated in Georgia in 2003 and 2004 for resistance to multiple diseases in an effort to further quantify resistance in released cultivars and facilitate selection of advanced lines. Greenhouse screens were used to assess susceptibility to peanut root knot nematode (*Meloidogyne arenaria*) and Cylindrocladium black rot (CBR) caused by *Cylindrocladium parasiticum*. Susceptibility of genotypes to root knot ranged from 1.2-4.8 on a 0-5 scale, with the only genotypes showing excellent resistance being those with known resistance genes such as Nematam. Root rot ratings from CBR ranged from 1.1-4.6 on a 1-5 scale, with some experimental lines being highly susceptible and some showing very good resistance. Replicated field plots with minimal fungicide sprays were used to assess susceptibility to tomato spotted wilt virus (TSWV), leaf spots (*Cercospora arachidicola* and *Cercosporidium personatum*), and stem rot (*Sclerotium rolfsii*). The environment was very favorable for fungal diseases both years and severe levels of disease developed. A wide range of susceptibility to stem rot was found with GA-02C, AP-3 and DP-1 being among the most resistant, with some genotypes, primarily virginia types, being highly susceptible. Mean length of individual disease loci ranged from 2.6-39.5 inches, with Georgia Green, the current industry standard being 18.6 inches. Leaf spot ratings ranged from 3.8-7.6 on the Florida 1-10 scale in 2003, and 4.9-9.4 in 2004 with Georgia Green being a 5.8 and a 7.4, respectively. Incidence of symptoms caused by TSWV was too low to be meaningful. Overall this was a good evaluation of a diverse set of genotypes. Some that perform well in other states may not be as suitable for widespread planting in the southeast due to the prevalence of different diseases. Other genotypes were very promising and will be evaluated in more detail. This information will be critical as breeders decide which genotypes to develop, and it will help production specialists prescribe levels of input based on the disease susceptibility of cultivars that are released.

Utilization of Early-Planted Yield Test to Evaluate for TSWV-Resistance among Peanut Genotypes in Georgia. W.D. BRANCH*, Dept. of Crop and Soil Sciences, and T.B. BRENNEMAN and A.K. CULBREATH, Dept. of Plant Pathology, University of Georgia, Coastal Plain Experiment Station, Tifton, GA 31793-0748.

The recommended planting date for peanut (*Arachis hypogaea* L.) in Georgia was from April 15 to May 15 depending upon moisture and temperature for many years. However after tomato spotted wilt caused by *Tomato spotted wilt virus* (TSWV) became a major peanut disease problem, the University of Georgia tomato spotted wilt index recommends optimum planting dates of May 11-25 to minimize TSWV risk. Conversely to maximize TSWV risk, an early-planting time in mid-

April was utilized to evaluate disease incidence and yield performance among new runner and virginia peanut cultivars and advanced Georgia breeding lines. Replicated yield tests were conducted during the past two years at the Coastal Plain Experiment Station at Tifton and the Southwest Georgia Research and Education Center near Plains, GA. Results from these early-planted yield tests showed significant differences among the genotypes and years. In general, 2004 had greater TSWV disease pressure than 2003. In both years and at both locations, the most resistant and the most susceptible runner and virginia-types performed fairly consistently across the different environments which suggest that such early-planted tests could be utilized to evaluate for TSWV-resistance among peanut genotypes in Georgia.

The Utility of Cultivar Selection and Cultural Practices for Managing Tomato Spotted Wilt Virus (TSWV) in Virginia-type Peanut. P.M. PHIPPS*, Tidewater Agricultural Research & Extension Center, Virginia Polytechnic Institute & State University, Suffolk, VA 23437.

Commercial cultivars of virginia-type peanut lack resistance to tomato spotted wilt virus (TSWV) according to disease incidence in field trials from 2001 to 2004. NC-V 11, CHAMPS, and Gregory were generally moderately susceptible to TSWV, whereas Wilson, VA 98R, VA-C 92R and Perry ranged from moderately susceptible to highly susceptible. NC 12C was consistently highly susceptible. According to a field trial in 2004, the differences in susceptibility of commercial virginia-type cultivars were of little or no practical value for disease control in comparison to TSWV-resistance expressed by AT VC2 and Georgia Hi O/L or TSWV-resistance in runner-type cultivars such as Andru II, ANorden, DP-1, Georgia Green, Georgia-02C, Hull, Georgia-03L, AP-3 or C99R. When commercial cultivars of virginia-type peanut were compared in single and twin rows, TSWV incidence at standard seeding rates was not affected significantly by row patterns, and not all cultivars showed a significant reduction in TSWV incidence with increased seed rates in twin rows. In 2002, TSWV incidence was compared in NC-V11 and Perry in single rows at four and six seed/ft and twin rows at two and three seed/ft in each of the twin rows. Row pattern and seeding rate did not have a significant effect on TSWV incidence in Perry. NC-V11 had levels of TSWV similar to Perry in single and twin rows with standard seeding rates, but levels were reduced significantly by the high seeding rate in single and twin rows. Another trial in 2002 compared cultivars in single rows at four seed/ft and twin rows at two and three seed/ft in each twin row. TSWV incidence was reduced significantly in VA 98R, Wilson and Gregory in twin rows with the high seed rate but was not in twin rows of Perry at the high seed rate. In 2003, the susceptibility of Perry and NC-V11 in single rows at seeding rates of three and four seed/ft of row was compared in strip tillage and conventional tillage. The effect of tillage and seeding rate on TSWV was not significant. Cultivar was marginally significant on Aug 29 when Perry exhibited a higher incidence of TSWV than NC-V 11. In 2004, TSWV incidence was assessed in Gregory and Perry planted weekly from Apr 8 to May 19.

Ratings on Jun 25 showed significantly higher TSWV incidence in Perry, and disease incidence was progressively reduced with later planting dates. The Jul 20 rating again showed significantly more TSWV in Perry, but the highest levels of disease incidence were recorded in plantings on Apr 28 and May 6. While cultivar selection and planting date are heavily weighted factors in the Georgia-TSWV Risk Index, this approach may have limited value in Virginia due to the general lack of disease resistance in commercial virginia-type cultivars. Furthermore, the high susceptibility of virginia-type cultivars compared to new runner-type cultivars may be limiting the additive benefits of cultural practices such as twin row patterns, increased seed rates and reduced tillage for management of TSWV in Virginia.

Spotted Wilt and Runner Peanut Canopy Characteristics. M.C. BLACK*, N.T. TROXCLAIR, M.R. BARING, A.M. SANCHEZ, and J.L. DAVIS. Texas A&M University, Texas Cooperative Extension, Uvalde, TX 78802 and Texas Agricultural Experiment Station, College Station, TX 77843-2474.

Nine peanut varieties and two breeding lines with a range of spotted wilt (caused by *Tomato spotted wilt virus* (TSWV)) field reactions were mapped for vegetative stem growth in 2004 when spotted wilt was intense (test mean--46% row ft with symptoms, entry range--6 to 90% at last rating). The experimental design for two-row 15-ft plots was a randomized complete block with four replications. Whole plants (almost all asymptomatic) were destructively sampled 29Jun, 28Jul, and 7Sep by removing a minimum of three plants in 1 row-ft from each of the two rows per plot (minimum six plants per plot). All branch lengths on the six largest plants were recorded (primary, secondary, tertiary, quaternary, quinary). Spotted wilt was rated 22Jul, 17Aug, and 6Oct. Plot means (from six plants) for stem lengths and several other variables were calculated. Data were compared using analysis of variance, Pearson correlation, and stepwise regression (model selection also based on minimum C(p) statistic). Plant height (main stem length) and width (secondary branches 1 to 4 lengths) were always positively correlated ($P \leq 0.05$) with increased spotted wilt. All significant correlations of disease with lengths of tertiary branches on secondary stems 3 to 5 were negative. Significant correlations between spotted wilt and lengths of mid-canopy secondary branches 6 to 11 were all negative. Greater mid-canopy stem lengths may obscure main stems and lower secondary stems and decrease outer canopy porosity. Thirty-nine of 44 significant correlations between spotted wilt and calculated variables describing overall plant size were positive. Regression analysis of stem lengths on three dates with three spotted wilt ratings explained significant portions of total variation in spotted wilt disease. Six of nine significant models had positive terms for secondary stems 1 to 4 lengths, and only one significant model had a negative effect for one of these secondary stem lengths. For the last sampling date, models for all three disease ratings included a negative term for secondary stem 6 length. Variety canopy characteristics apparently affect spotted wilt epidemics. This helps explain benefits of high plant populations and twin-row planting patterns during spotted wilt epidemics

because both management practices affect the canopy (less prominent main stems, earlier canopy closure (lapping)). Possible explanations for canopy effects on spotted wilt include changes in thrips behavior and thrips predation. The canopy traits related to spotted wilt variety ratings explored in this study can be described as "field resistance." "Field resistance" should be stable with variable TSWV populations and additive with "true resistance" (detected with mechanical inoculation in growth chamber tests). Canopy traits may be useful selection traits for locations and years with low spotted wilt intensity.

Effect of Phorate on the Incidence of Tomato Spotted Wilt Virus and Antioxidants in Peanut. N.P. SHAIKH*, G.E. MACDONALD, B.J. BRECKE, Agronomy Department, University of Florida, Gainesville, FL, 32611; and M.B. ADJEI, 3401 Experiment Station Range Cattle Research Education Center, University of Florida, Ona, FL, 33865.

Field experiments were conducted in 2001 and 2002 at Citra, Florida to study the effect of phorate insecticide applied at 0.0, 0.57, 1.14, 2.28, and 4.56 kg a.i./ha on the incidence of tomato spotted wilt (TSW), peanut injury, canopy width, and yield in peanut (*Arachis hypogaea* L.). Phorate at 2.28 kg a.i./ha was shown to result in lower (6%) incidence of TSW compared to the untreated control (27%). Phorate rates of 2.28 and 4.56 kg a.i./ha caused injury to peanut in the form of brown necrotic spots on the margins of the leaves. Interestingly, there was an increase in canopy width but this was not reflected in increased yields of peanut. In laboratory studies the rates of 0.0, 0.114, 1.14, 11.4 kg a.i./ha of phorate were applied to characterize the effect of phorate on chlorophyll fluorescence and antioxidant concentration in peanut. Phorate caused a reduction in chlorophyll fluorescence yield by 4.6, 4.6 and 5.4% with applications of 0.114, 1.14, 11.4 kg a.i./ha, respectively, compared to the untreated control. Phorate at 11.4 kg a.i./ha increased the concentration of ascorbic acid by 33%, catalase by 29% and superoxide dismutase by 88% compared to the untreated control, whereas the concentration of glutathione reductase was not affected. An increase in the antioxidant responses suggests that the presence of phorate or its metabolites in peanut may lead to increased levels of reactive oxygen species (ROS), which increases the concentration of antioxidants. There was also visual evidence of oxidative stress, which is reflected by the visual symptoms of brown necrotic spots on the leaf margins. It can be concluded from this study that phorate and its metabolites increase the antioxidant levels in peanut which may trigger defense mechanisms in plants and result in decreased incidence of TSW observed under field conditions. The increased ROS may also interfere in the multiplication or movement of the virus thereby causing reduced disease incidence.

GRADUATE STUDENT COMPETITION

Using Hyper Spectral Imaging to Predict Peanut Pod Maturity. D. CARLEY*, D. JORDAN, and M. BURTON, Department of Crop Science, North Carolina State University, Raleigh, NC 27695; C. DHARMASRI, Syngenta Crop Protection, Greensboro, NC 27419; T. SUTTON, Department of Plant Pathology, North Carolina State University, Raleigh, NC 27695-7616; and R. BRANDENBURG, Department of Entomology, North Carolina State University, Raleigh, NC 27695-7613.

Research was conducted in North Carolina during 2003 and 2004 to determine if hyperspectral imaging could be used as a predictor of peanut pod maturity. Canopy reflectance was measured in late September and early October using an ASD FieldSpec Pro FR portable spectroradiometer. Reflectance for each wavelength 350 to 2,500 nm was grouped into 50 nm sections. Data for pod yield; percentage of total sound mature kernels (% TSMK), extra large kernels (% ELK), and fancy pods (% FP), and pods with brown or black mesocarp color; and reflectance were subjected to analysis of variance. In one experiment, the Virginia market type cultivar VA 98R was planted approximately May 5, May 15, May 25, and June 5, and peanut pods for each planting date were dug based on pod mesocarp color determination. In a second experiment, the cultivar NC-V 11 was planted in early or mid May or in early June, and peanut pods for each planting date were dug based on pod mesocarp color. In the third experiment, the cultivars VA 98R and Perry were planted in early May in single and twin row planting patterns. These cultivars can differ in the number of days required to reach optimum pod maturity by as much as 12 days. Imaging data was correlated with the percentage of brown and black pod mesocarp color for each planting date. Percentages of brown and black pods for the May 5, May 15, May 25, and June 5 planting dates were 68, 63, 56, and 31% in 2003 and 69, 69, 40, and 22% in 2004, respectively, when images were recorded on the same day for all plots in late September. Pod mesocarp color differed when NC-V 11 was planted in early or mid May compared with planting in early June. There was no difference in reflectance when comparing images from the peanut canopy in either planting date trial in 2003; however, some differences in reflectance were noted in both trials. While pod maturity differed when comparing mesocarp color of VA 98R and Perry in the row pattern study, the only difference in reflectance in either of the two years was noted between cultivars in 2003, in the 1350-1399 nm bands. In a final experiment, the cultivars Gregory and Georgia Green were planted to determine if hyperspectral differences could be detected between the Virginia market type cultivar Gregory and the runner market type cultivar Georgia Green. In 2003, no significant differences were noted between cultivars. In 2004, however, there were differences between cultivars in the upper-visible spectrum through the infrared region of the spectrum, from 700 nm to 1149 nm. In the third trial, the only significant differences between cultivars were noted in the infrared region from 900-945 nm, and 1100-1199 nm. These data suggest that hyperspectral imaging does not appear to be an accurate indicator of pod maturity. In late September distinct differences in pod mesocarp

color were noted for all experiments although few consistent differences in hyperspectral imaging were noted. These data are consistent with observations by others, at least in the visible range, indicating that aboveground plant growth is a poor indicator of peanut pod maturity.

Development and Utilization of a More Rapid Assessment Method to Identify Resistance to *Meloidogyne arenaria* in Peanut. W. DONG, Department of Plant Pathology, The University of Georgia, Tifton, GA 31793; C.C. HOLBROOK, P. TIMPER, USDA-ARS, Coastal Plain Exp. Stn. Tifton, GA 31793; T. BRENNEMAN, Department of Plant Pathology, The University of Georgia, Tifton, GA 31793; and J.P. NOE, Department of Plant Pathology, The University of Georgia, Athens, GA 30602.

During 2002-2004, pot trials were conducted in Tifton, Georgia to develop and evaluate a more rapid method for assessing resistance to *M. arenaria* (Ma) in peanut under greenhouse conditions. Four peanut genotypes with different levels of resistance to Ma were inoculated with either eggs or second-stage juvenile (J2) at two different concentrations (2000 J2, 4000 J2, 8000 eggs, and 16000 eggs per pot). Plants were rated for resistance using gall indices and gall counts at 2 and 4 weeks after inoculation (WAI). These ratings were then compared to resistance ratings (gall index, gall counts, and eggs/g root) made at 6 and 10 WAI. Logistical considerations favor the use of the 8000-egg inoculum method. Gall number or an index based on percentage of roots that are galled can be used to separate the different levels of resistance in peanut two weeks (150 degree days) after inoculation. Consistent reductions in nematode reproduction can be identified 6 WAI (about 520 degree days) and 10 WAI, based on egg mass index or eggs/g root. The results of the rapid screening method (2 WAI) were similar to the conventional method (7 WAI) when 40 peanut plants were assessed for resistance to Ma. Pearson's correlation coefficients were calculated to compare the galling indices and gall number. Significantly positive correlations ($P \leq 0.01$) were observed among galling index systems and gall number. We propose a two-stage greenhouse screening protocol to identify peanut genotypes with resistance to the root-knot nematode. A preliminary screen would first be used to eliminate susceptible genotypes based on gall number or percent root galled 14 days (150 degree days) after inoculation with 8000 eggs. The selected genotypes should then be assessed for egg mass index or egg number per gram fresh root at 6 weeks (520 degree days) after inoculation to verify the resistance.

Using Integrated Disease Management Data to Validate a Risk Index for Southern Stem Rot. J.E. WOODWARD*, T.B. BRENNEMAN, R.C. KEMERAIT, JR., and A.K. CULBREATH, Department of Plant Pathology, The University of Georgia Coastal Plain Experiment Station, Tifton, GA 31793.

Southern stem rot, caused by the soilborne fungus *Sclerotium rolfsii* Sacc., is a devastating disease of peanuts in the southeastern United States. Yield losses range from 5-10%, but may exceed 60% if the

disease is not adequately managed. While fungicides remain the standard for managing stem rot, cultural practices such as crop rotation, cultivar selection, row pattern, irrigation and planting date have all been shown to impact development of the disease. These factors, in addition to the disease history of a field, are components of a risk index that is currently available to Georgia producers. The aforementioned cultural practices each affect disease severity to a different degree. Therefore, the variables included in the index have been assigned a weighted point value based on results from trials evaluating the effect of a specific practice on stem rot development. By totaling the points for each factor, producers can quantitatively determine if their relative risk is low (10-25 points), moderate (30-50 points), or high (≥55 points) and plan their fungicide inputs accordingly. Reduced versus full inputs of fungicides were evaluated in fields with a range of risk values to validate this approach. One-hundred comparisons were made from trials utilizing various combinations of cultural practices covered by the index, and point totals ranged from 20 to 75. The number of data points per risk category were 10, 40, and 50 for low, moderate, and high categories, respectively. A total of ten cultivars were evaluated with Georgia Green, C-99R and Georgia 01R used in 34, 25 and 11% of the trails, respectively. The effects of using a reduced program in fields with varying levels of disease risk were assessed by comparing the yields of reduced programs to the respective standard programs. There was a negative linear relationship between disease risk and yield ($y = -0.1822x + 104.88$; $R^2 = 0.3886$, $P=0.0358$); where y is the % of maximum yield obtained with a full fungicide program and x represents the risk index value. Despite this relationship, significant yield reductions from using a reduced fungicide program occurred in twelve of the scenarios, all of which were deemed as having an increased risk of stem rot. Of these twelve scenarios, seven occurred in trials planted with varieties having lower levels of stem rot resistance. In addition, the majority of the instances where significant reductions occurred were in excessively wet seasons. These results suggest that the University of Georgia southern stem rot index is a means of measuring disease risk; however, as more data is evaluated, the model may be changed to enhance accuracy and minimize the likelihood of crop losses where reduced fungicide programs are used.

Durability of Leaf Spot Resistance in Advanced Peanut Breeding Lines in North and South America. S.K. GREMILLION*, A.K. CULBREATH, Dept. of Plant Pathology, University of Georgia, Tifton, GA, J.W. TODD, Dept. of Entomology, University of Georgia, Tifton, GA, D.W. GORBET, Agronomy Dept., University of Florida, Marianna, FL, and R. PITTMAN, USDA-ARS, Griffin, GA.

Disease resistance of advanced peanut breeding lines to early and late leaf spot, caused by *Cercospora arachidicola* and *Cercosporidium personatum*, respectively, was evaluated in the Georgia, USA and Bolivia in 2004-5. Trials were planted in a split plot design with fungicide regimes as the whole plots and genotypes as the split plots. Fungicides included 1) non-sprayed control and 2) a two part application of

tebuconazole. The cultivars Georgia Green (GG), Bolivian Bayo Grande (BG), C-99R and Florida MDR-98 and the advanced breeding lines CRSP-01, CRSP-08 and CRSP-14 were compared. In Georgia, when AUDPCs for the leaf spot epidemic were measured, genotype was significant at all three test locations ($P \leq 0.0001$). All advanced lines showed less leaf spot when compared to the cultivars tested. Final disease evaluations (Y-final) were significant for genotypes at all three locations with GG showing the highest levels of disease and BG and the breeding lines with the lowest. Yields were also impacted by genotype ($P \leq 0.05$) with the new lines yielding significantly higher than GG in two of the locations ($P \leq 0.0001$). Fungicide regimes were significant at only one location ($P \leq 0.05$) with the 2-spray program out-yielding the non-sprayed. A fungicide X genotype interaction occurred in yields at one location ($P \leq 0.05$) with the yields of MDR-98 and GG showing a significant increase under the 2-spray fungicide regime compared to the non-sprayed control. In Bolivia, leaf spot AUDPC was significant for genotype at the two testing locations ($P \leq 0.05$). Georgia Green and CRSP-14 were lowest at one location and BG and CRSP-01 at the other. At one site, Y-final was significant for genotype ($P \leq 0.05$) and a fungicide X genotype interaction ($P \leq 0.05$) was present. All genotypes showed low levels of leaf spot. Yields were not significantly different among genotypes or fungicide regimes at either location.

Incidence of Southern Blight of Okrun Peanut Grown in Soil Previously Planted to *Sclerotium rolfsii*-infected Weeds and Peanut. C.B. MEADOR*, and H.A. MELOUK. Department of Entomology and Plant Pathology and USDA-ARS. D.S. MURRAY, Department of Plant and Soil Science, Oklahoma State University, Stillwater, OK 74078.

Incidence of Southern Blight (SB) on Okrun peanut was determined in soil previously planted to weeds and peanut that were inoculated with *Sclerotium rolfsii*. Five weeds (Crownbeard, Eclipta, Jimsonweed, Pitted Morningglory and Sicklepod) and two peanut cultivars, Okrun and Southwest Runner, were grown in bulb pans (30 cm dia) for 5-7 weeks at three plant densities (1,4 or 8 plants/0.093 m^2). Individual plants within each bulb pan were inoculated with *S. rolfsii*. Each bulb pan was enclosed in a clear polyethylene bag (38.1x 91.44 cm) that was tied at the top forming an enclosure to ensure relative humidity of more than 95% for two days. Polyethylene bags were opened at 2 days post-inoculation (DPI). Lesions on infected plants were measured at 2,3,4,5 & 6 (DPI). The polyethylene bags were then removed and the plants were allowed to dry for four weeks. The dried plant material was incorporated into the soil of each bulb pan, and four seeds of Okrun peanut were planted in each. Incidence (%) of SB on Okrun planted following infected weeds and peanut was recorded throughout the season until the plants reached maturity (150 days after planting). The Okrun plants were then dug, and percent of *S. rolfsii*- infected pods was determined. Soil samples were collected from each bulb pan to quantify viable sclerotial density. This study was conducted twice. In Experiment I, disease incidence on Okrun following infected Sicklepod was significantly higher ($p<0.05$) than all other weeds or peanut which

were not significantly different from one another. Peanuts grown behind Crownbeard, Sicklepod and Southwest Runner all had significantly higher percentages of infected pods than Pitted Morningglory, Jimsonweed and Eclipta. Sclerotial density in soil following peanut harvest showed no effect due to plant species. In Experiment II, all weed species allowed for significantly higher incidence of Southern blight than the control. The highest disease incidence resulted from Okrun peanut being grown following infected Pitted morningglory. Okrun peanut following Okrun, SWR and Pitted morningglory had significantly higher pod infection than the control. Sclerotial density in the soil was significantly higher than the control as a result of all weed species and both peanut cultivars. These data indicate that each of the five weed species is capable of causing an increase in Southern blight incidence as a consequence of their infection with *S. rolfsii*.

Evaluation of Alternating Application and Protective Properties of the Fungicides Fluazinam and Boscalid for Control of Sclerotinia Blight in North Carolina. D.L. SMITH*, J.E. HOLLOWELL, and B.B. SHEW. Department of Plant Pathology, NC State University, Raleigh, NC 27695.

Sclerotinia blight caused by the fungus *Sclerotinia minor* is a serious disease of cultivated peanut (*Arachis hypogaea* L.) in North Carolina. Several fungicides are available for control of Sclerotinia blight; however, little information on comparative efficacy at different timings of fungicide applications is available from field studies. Field trials were conducted in two North Carolina counties in the 2003 and 2004 growing seasons to compare the efficacy of fluazinam and boscalid. Cooperative grower fields with a history of Sclerotinia blight were planted with the susceptible cultivar NC-V 11 in both years. In 2003, varying rates of fungicide were evaluated on calendar or advisory regimes. In 2004, all applications were made on a calendar schedule, but treatments involved alternating boscalid, fluazinam, or no fungicide on each of the three possible application dates. Newly infected plants were marked weekly for 10 weeks in 2003 and for 12 weeks in 2004. In the greenhouse three cultivars and an experimental breeding line were planted to deep flats. Plants were grown until flowering (6-8 weeks) and lateral branch inoculations were made either 4 or 2-day pre-fungicide application, at the time of inoculation, or 2 or 4 day post-fungicide application. Plants without fungicide treatment also were inoculated. Lesion length was measured after symptom development. Destructive samples and counts of pods ($\geq$ R3 stage) were taken at the completion of the experiment. In the field, application and timing of the first fungicide spray was critical for improved disease control and yield. No differences in the efficacy of the protective fungicides evaluated were evident. This information may prove useful in making fungicide recommendations in conjunction with developing disease advisories to control Sclerotinia blight in the field.

Temperature Effect During Seed Development on Oil and Seed Quality of Conventional and High-Oleate Large Seeded Virginia-Type Peanut. M.H. SUN*, J.F. SPEARS, T.G. ISLEIB, and D.L. JORDAN. Dept. of Crop Science, North Carolina State University, Raleigh, NC, 27695-7620.

Because of its greater oxidative oil stability, the high-oleate trait is of great interest to the peanut processing industry. Many peanut breeding programs have incorporated the high-oleate trait into adapted cultivars. It is not known however, if the high-oleate trait will influence peanut seed germination and vigor. An experiment was designed to evaluate seed and oil quality of both conventional and high-oleate peanuts produced in cool and warm environments. Three cultivars, NC 10C, NC-V 11 and Gregory, along with their three paired backcross-derived high-oleate lines were planted in greenhouses maintained at 22/18^{o}C, 26/22^{o}C and 30/26^{o}C day/night temperature. A split-plot experimental design with 3 replications was used. Pods were harvested by hand and analyzed for seed vigor measured as electrical conductivity (EC) as well as for Oleic/Linoleic ratio (O/L) of the oil. When averaged across the three conventional varieties, EC decreased as production environment temperature increased. For their high-oleate pairs however, EC was lowest for peanuts grown in 26/22 ^{o}C (3.9 mhos cm^{-1} g^{-1}), followed by those in 30/26 ^{o}C (5.9 mhos cm^{-1} g^{-1}). Highest EC (6.8 mhos cm^{-1} g^{-1}) resulted from high-oleate peanuts grown in 22/18 ^{o}C. The O/L ratio of conventional peanuts grown in 22/18^{o}C, 26/22^{o}C, and 30/26^{o}C measured 1.39, 1.49 and 1.85, respectively. The O/L for their high-oleate pairs increased from 16.2 when grown in 22/18 ^{o}C to 19.2 in 26/22^{o}C and to 27.2 when grown 30/26^{o}C. Our data suggests that increasing production environment temperature can increase the O/L ratio of high-oleate peanuts. However, either high or low production temperatures can adversely affect seed vigor of the high-oleate peanuts.

PROCESSING AND UTILIZATION/HARVESTING, CURING, SHELLING, STORING, HANDLING

Use of Near Infrared Reflectance to Predict Sensory Quality of Peanuts. H.E. PATTEE*, T.G. ISLEIB, W.F. MCCLURE, F.G. GIESBRECHT, and T.H. SANDERS, Dept. of Biological and Agricultural Engineering, Dept. of Crop Science, Dept. of Statistics, North Carolina State University, Raleigh, NC 27695-7625, and USDA-ARS Market Quality and Handling Research Unit, Raleigh, NC 27695-7624.

Improvement of sensory quality is a long-standing goal of the peanut breeding program at NCSU. The number and timeliness of sample assay for sensory quality is limited by the complications of sample preparation and cost of a descriptive sensory panel. A faster, lower-cost method is needed to permit acquisition of flavor data on large numbers of samples. Near infrared reflectance (NIR) has been used to measure composition traits in foods. Ninety-four samples from a 2002 field study of peanut flavor genetics were subjected to NIR spectral analysis.

Absorbance was measured at 1050 electromagnetic wavelengths (400-2500 nm) using ground raw peanuts and corresponding roasted peanut pastes. A stepwise multiple regression model building procedure was applied to relate the previously recorded sensory data on the roasted peanut, sweet, and bitter attributes to the NIR data. The best fitting models were obtained using NIR data from ground raw samples. Validation of the model was performed by recording NIR data on 395 samples grown in 2003, including 186 entries from the NCSU Advanced Yield Test and Disease Preliminary Test. Sensory scores for roasted peanut, sweet, and bitter were predicted using the models based on 2002 data, and a representative range of samples were submitted to the sensory panel. The correlations between sensory panel scores and predictions based on NIR spectra were 0.36 for roasted peanut, 0.74 for sweet, and 0.41 for bitter. When the sensory data from the 2002 and 2003 samples were combined, the correlations between observed and predicted sensory scores increased to 0.73 for roasted peanut, 0.86 for sweet, and 0.72 for bitter. NIR spectral analysis appears to be potentially useful for predicting sensory scores of large numbers of lines in a breeding program. Analysis of flavor by sensory panel will be necessary to verify flavor late in the variety development process; however, it appears to be possible to evaluate flavor potential in early breeding lines.

Value-added Nutraceuticals from Peanut Processing By-products. M. AHMEDNA*, J. YU, and I. GOKTEPE, Food and Nutritional Sciences, 161 Carver Hall, North Carolina A&T State University, Greensboro, NC 27411.

Peanut skin is a by-product of the peanut industry that has low economic value despite the high content of antioxidants such as phenolics. Peanut skins were obtained by direct peeling, blanching, and roasting. Total phenolics (TPs), total antioxidant activity (TAA) and free radical scavenging capacity of peanut skin extracts were determined. The composition of ethanolic extracts of peanut skin obtained from each processing method was determined by LC-MS. Peanut skin processing methods significantly affected total and composition of ethanol extractable phenolics. Roasting had limited effects on concentration of TPs while blanching caused 89% loss of TPs. TPs in directly peeled, roasted, and blanched peanut skins were 130, 124, and 14.4 mg/g dry skin, respectively. Catechins, A-type and B-type procyanidin dimers, trimers and tetramers in chemically purified peanut skin extracts were identified by LC-MS. Total catechins, procyanidin dimers, trimers and tetramers in directly peeled peanut skin were 16.1, 111.29, 221.33 and 296.07 mg/100g, respectively versus 8.79, 143.48, 157.53 and 203.91 mg/100 g, respectively in roasted skin. TAAs and free radical scavenging capacities of peanut skin extracts were all higher than those of Trolox and Vitamin C at equivalent concentration. Peanut skin, a by-product of the peanut processing industry, was found to contain potent antioxidants and could provide an inexpensive source of antioxidants for use as functional ingredients or dietary supplements.

Optimization of Physical Properties of Textured Peanut Patties using Binders. M.J. HINDS*, Nutritional Sciences Department, Oklahoma State University, Stillwater, OK 74078; M.N. RIAZ, Food Protein Research & Development Center, Texas A&M University, College Station, TX 77843; D. MOE, Food and Agricultural Products Research and Technology Center, Oklahoma State University, Stillwater, OK 74078.

Textured peanut (TP), which imparts no beany flavor, may be produced by extrusion processing of defatted peanut meal. Results from a previous study indicated that hamburger-style patties containing up to 80% rehydrated TP replacing beef would have good texture. However, products containing TP only would be appropriate for vegetarians and would also provide more value-added utilization of peanuts. The objective of this study was to investigate the effects of two binders on physical properties of patties prepared from rehydrated TP only. Response surface methodology and a three-level Box-Behnken Balanced Incomplete Block Design of rehydrated TP [1:2, 1:1, 2:3 ratio of TP:water], Colloid Bind I-96 (TIC Gums) [CollB: 1.0, 1.25, 1.5%, wt rehydrated TP], and Carrabind 80A (Carrageenan Company) [CarraB: 0.5, 1.0, 1.5%, wt rehydrated TP] were used. Blanched and skinned Runner variety peanuts were defatted and ground into meal, which was then texturized by a Wenger TX-52 twin-screw extruder to produce the TP. Fifteen treatments of patties were prepared using various combinations of rehydrated TP, CollB and CarraB according to the experimental design. Texture profile (TA XT2*i* Texture Analyzer fitted with TA-25 probe at test speed of 1mm/sec), color (Minolta Chomameter), water activity (Rotronic meter), cook yield and sensory screening were used to evaluate experimental peanut patties and commercial soy and beef patties and set limits for acceptability. ANOVA indicated that the independent variables affected cook yield; the textural variables of hardness, chewiness, cohesiveness, springiness, resilience, and gumminess; and L value of the patties. Hardness of the patties increased with increased TP and increased CarraB for all levels of CollB. When patties contained 0.5-1.0% CarraB, their hardness increased with increased TP only, but for CarraB >1.0%, patties were softest when CollB was 1.1-1.3%. Chewiness increased mainly with increased CarraB when CollB was 1.0-1.25%, but increased with increased TP when CollB was 1.5%. When CarrB was 0.5%, the most chewy patties contained >1.4% CollB, but for CarraB at 1.0-1.5%, the most chewy patties contained <1.1% CollB. Springiness increased with increased CarraB when CollB was 1.0-1.25%, but springiness increased with increased CarraB and decreased TP when CollB was 1.5%. When CarraB was 1.0-1.5%, springiness increased as TP decreased and CollB increased, but when CarraB was 0.5%, springiness increased with increased TP and 1.0% CollB or with minimal TP (1:2 TP:water) and 1.5% CollB. Peanut patties with optimum physical properties and cooked yield can be produced from formulations containing a 2:3 ratio of TP:water combined with 1.13-1.27% CarraB and 1.25-1.46% CollB, verifying that TP can be used successfully as a meat analog.

Enhancing the Value and Safety of Peanuts in Senegal. A. KANE*, Institut de Technologie Alimentaire, BP 2765, Hann, Dakar, Sénégal; and M. AHMEDNA, Dept. of Human Environment & Family Sciences, 161 Carver Hall, North Carolina A&T State University Greensboro, NC 27411, USA.

Peanut is a staple crop in Senegal consumed as snacks, paste, sauce, cake, and condiments by about 70 % of the population. However, aflatoxin contamination is widespread and poses serious potential health risks to consumers. Improvements in value added use of peanuts could benefit the peanut industry in Senegal. For instance, peanut milk remains unknown in Senegal despite its popularity in many Asian countries. This presentation discusses research effort undertaken in Senegal to find inexpensive ways to detoxify aflatoxin contaminated peanut and develop new value-added products. Research was conducted to explore the detoxification of peanut paste using local Senegalese clays. Activated and non-activated attapulgite clays were used at 0.5, 1, 2 or 5% to detoxify peanut paste under normal storage temperature. Treated products were stored for up to one month during which Aflatoxin B1 and G1 were monitored by HPLC. Results show that aflatoxin B1 and G1 decreased from 16 to 8.1 ppb when 0.5 and 5% of non activated attapulgite were used. Activated attapulgite resulted in higher detoxification efficiency with final contamination levels of about 3 ppb for both aflatoxin B1 and near complete elimination of aflatoxin G1 by the smallest concentration of clay (0.5 %.). After one month of storage, over 95% of toxins were removed by 1-5%. In terms of value-added product development, peanut milk was developed from raw peanut (variety 73-33) via alkaline extraction followed by filtration. The composition of peanut milk was determined and compared to that of cow milk. Fat content of peanut milk was comparable to that of cow milk but had lower dissolved solids, protein, and calcium contents. However, such contents could be further adjusted to be comparable to cow milk. The minerals content in peanut milk was 245, 160, 182 and 80 mg/l for Ca, Mg, K and P, respectively. Due to its low sugar content, lactic acid fermentation was not efficient in producing fermented milk-like product despite a decrease in pH from 7.4 to 4.5 during fermentation.

Nondestructive Moisture Content Determination in In-Shell Peanuts. C.V.K. KANDALA* and C.L. BUTTS, USDA, ARS, National Peanut Research Laboratory, Dawson, GA 39842

A method was developed earlier for estimating the moisture content in small samples of peanut kernels, nondestructively, by measuring their complex impedance values. In this method, capacitance, phase angle and dissipation factor were measured with an impedance analyzer at 1 and 5 MHz on a parallel-plate capacitor holding a few peanut kernels between the plates. These values were then used in an empirical equation and the moisture contents were calculated successfully within 1% of their air-oven values for about 85% of the peanut kernel samples tested in the moisture range of 6 to 22%. However, it would be useful during drying and processing if the moisture content could be determined, for peanuts, without shelling them. In this work, the feasibility of determining the moisture content of in-shell peanuts (pods)

by similar impedance measurements was investigated. Measured values of capacitance, phase angle and dissipation factor were used in a modified prediction equation and the moisture contents were estimated within 1% of their air-oven values, for 85% of the pod samples tested, in the moisture range of 7 to 22%. The method is rapid and nondestructive and may be used in the development of a commercial instrument.

Effect of Bulk Handling on Peanut Seed Quality. C.L. BUTTS*, W.H. FAIRCLOTH, R.C. NUTI, D.L. ROWLAND, M.C. LAMB, USDA, ARS, National Peanut Research Laboratory, Dawson, GA 39842; and W.R. GUERKE, Georgia Department of Agriculture, Seed Laboratory, Tifton, GA 31793.

Bulk handling system tenders to load planting hoppers are used for corn, soybean and small grain but have not been used for peanut because of potential excessive mechanical seed damage.

Tests were conducted to measure the mechanical damage to peanut seed in bags and on a belt-type- and a pneumatic bulk seed tender. Twenty 23-kg bags of treated Georgia Green peanut seed were obtained and each bag was divided into two 11.4-kg samples. A 500-g subsample was retained to determine initial levels of mechanical damage. After all peanut seed were divided and loaded into the bulk seed tenders, each tender was operated and approximately 11.4 kg of peanut seed were loaded into a plastic bucket to simulate loading a seed hopper on a planter. Total weight of peanut seed and the time required to transfer the seed from the bin to the bucket were recorded. Mass flow rate was controlled by opening and closing the gates on the feed hopper. A 500-g subsample was retained from each 11-kg sample for analysis. Tests were repeated until all peanut seed had been emptied from the bulk seed bin. Split/broken seed were hand sorted from each of the 500-g subsamples and weighed. The 500-g samples were subjected to standard and cold seed germination tests. An additional 1000-g sample was retained from each 11-kg sample and commingled with other seed from the same handling system to form a 23-kg composite sample for planting. The 23-kg sample was planted in four replicated plots. Seedling emergence was determined periodically beginning 4 d after planting until 30 d after planting.

The average flow rate for the belt system was 106 kg/min compared to 72 kg/min for the pneumatic system. Total damage was significantly higher in seed transferred from the bin to the planter using the bulk handling systems. Bagged seed, with no additional handling, had 0.5% total damaged seed. This was significantly lower than the 1.1% and 2.5% damaged seed using the belt and pneumatic systems, respectively. Germination percentages for bagged and pneumatically transferred seed averaged 95 and 96 %, respectively and were not significantly different. The seed transferred using the belt system had a significantly lower germination rate of 89%. Plant emergence percentages with economic comparison of the bulk seed handling systems to conventional manual handling of bagged seed will be presented.

Effect of Windrow Treatment on Peanut Pod Temperature and Flavor.

T.H. SANDERS*, USDA, ARS, Market Quality and Handling Research Unit, 3127 Ligon Street, Raleigh, NC 27695.

Curing temperature has been shown to affect flavor of peanuts. Studies were conducted over two years to evaluate the effectiveness of sandwich windrows, tent windrows, and windrows sprayed with Surround, a formulation of kaolin clay which has been used to lower leaf temperatures and in other applications to reduce temperature stress. Environmental conditions in the two years of the study differed widely during the treatments. In the first year ambient air temperature maximum was approximately 35 C with no wind and in the second year air temperature maximum was approximately 23 C with high winds. Pod temperatures in sandwich windrows were lower and reached a maximum more slowly than other treatments in both years. In the second year pod temperatures in tent windrows were similar to sandwich windrows. Surround treatment pod temperatures were higher than sandwich windrows and lower than normal windrows. Windrow treatment significantly affected flavor in the first year; however, in the moderate temperatures in the second year, there were no significantly different flavor intensities. These data indicate a protective effect of shade of peanut pods in windrows.

ECONOMICS I

Yield and Economic Responses of Peanut to Crop Rotation Sequence.

M.C. LAMB*, D.L. ROWLAND, R.B. SORENSEN, C.L. BUTTS, W.H. FAIRCLOTH, and R.C. NUTI. USDA, ARS, National Peanut Research Laboratory, Dawson, GA 39842.

Proper crop rotation is essential to maintaining high peanut yield and quality. However, the economic considerations of maintaining or altering crop rotation sequences must incorporate the commodity prices, production costs, and yield responses of all crops in, or potentially in, the crop rotation system. Certain commodity price combinations could exist that warrant shortening rotation sequences from a profit maximization standpoint that would be in direct conflict with agronomic recommendations. Farmers must be able to make these decisions within the scope of a single production season as well as knowing the longer-term impact on profitability of potential cropping systems. Proper farm planning and crop rotation response data are two essential elements that are prerequisite for farmers to adequately assess the economic and agronomic impacts of potentially changing crop rotation sequences. To address these elements, a large-scale irrigation and crop rotation research project was established in CY 2001. Five replicated irrigated and non-irrigated cropping sequences including peanuts, cotton, and corn were defined as: continuous peanuts (PPP), cotton/peanuts/cotton (CPC), corn/peanuts/corn (MPM), cotton/cotton/peanuts (CCP), and cotton/corn/peanuts (CMP). The peanut yield in the PPP rotation was 2945 kg ha^{-1} in the non-irrigated treatment. Non-irrigated yields in CPC and MPM rotation sequences

were 3512 and 3469 kg ha^{-1}, respectively and yields in CCP and CMP rotation sequences were 4252 and 4201 kg ha^{-1}, respectively. The peanut yield in the PPP rotation was 3636 kg ha^{-1} in the irrigated treatment. Irrigated yields in CPC and MPM rotation sequences were 4714 and 4669 kg ha^{-1}, respectively and yields in CCP and CMP rotation sequences were 5295 and 5365 kg ha^{-1}, respectively. The economic impacts of changing rotations can be quantified using the WHOLEFARM planning software. A new breakeven cross-commodity price matrix (CCPM) has been incorporated into WHOLEFARM to calculate the price change for a specific commodity that is required to equal profitability in other commodities. In addition, the CCPM can be used to directly calculate the price changes that would be required to justify shortening peanut rotation sequences.

Economic Benefits of Crop Rotation. T.D. HEWITT*, Department of Food and Resource Economics, University of Florida – North Florida Research and Education Center, Marianna, FL 32446-7906; and T.D. DAVIS, Department of Applied Economics and Statistics, Clemson University, Clemson, SC 29634-0313.

The new Farm Program and overall changes in government farm policies along with tighter profit margins have forced producers to explore ways to increase farm profits and improve production efficiency in farming operations. Profit incentives are now in place to develop and utilize farming systems that reduce costs while maintaining or increasing yields. Utilizing an economically and environmentally sound sustainable crop rotation system is one method that is being used by producers to reduce costs, lessen pest pressures, and increase yields. The main production limitations in the Southeast are poor soils, drought conditions, and pest problems. Rotation systems are a means to reduce the impact on these limitations. A good rotation system will add organic matter to infertile soils for better nutrient and water holding capacity, will lower compaction, and reduce pest levels. Studies throughout the Southeast have shown that both cotton and peanut yields may be increased by utilizing recommended crop rotation systems. Some sod based rotations systems have also been included in the rotation scheme to improve yields and soil fertility. Rotation studies have been analyzed in the Southeast to determine economic benefits. Both costs and returns are analyzed for various rotation systems that may also include cattle and/or hay in the systems. Production costs vary throughout the Southeast for peanuts. In some areas crop rotations may actually decrease per acre production costs. Some of the studies indicate cost are increased but are more than offset by increased yields. Labor constraints are also a factor that should be considered in the decision. Individual operations may be limited in what type of production system to use by labor availability. A Linear Programming model has also been developed to determine the rotations that are the most economical and consider labor constraints. Producers need to carefully consider rotation systems as a way to maintain increase profits and improve soil and cropping conditions. Choices among rotational systems are often just as dependent on local agronomic and management considerations than strictly on yield increases and rotational profitability.

Should I Produce Peanuts without Irrigation? Simulating the Risks and Returns for Non-Irrigated and Irrigated Peanut Production in the Southeast. T.D. DAVIS*, Department of Applied Economics and Statistics, Clemson University, Clemson, SC 29634-0313; and T.D. HEWITT, Department of Food and Resource Economics, University of Florida -- North Florida Research and Education Center, Marianna, FL 32446-7906.

With the elimination of the peanut marketing quota in the 2002 Farm Bill, peanut production has increased in the Southeast region. Many producers, especially those in South Carolina, are relatively new to peanut production and are learning the production practices. One question for new producers is the cost and returns to peanut production with and without irrigation. With favorable growing conditions in 2003 and 2004, new producers may not fully understand the production risk associated with non-irrigated production.

Producers need to understand if an investment in irrigation equipment will be profitable for the farm business. This is an expensive investment and the benefits may not be realized every year. For instance, irrigation may not have been beneficial in 2003 or 2004 because of favorable weather. Alternatively, the benefit of having irrigation during a drought may mean that the system will pay for itself in one year.

A stochastic simulation using farm-level yield data is used to determine the returns for non-irrigated and irrigated peanut production. The simulated returns will be used in determining if an investment in irrigation equipment will be profitable for different combinations of yields and prices. This information will be useful for producers considering investment in irrigation and to agricultural lenders financing investments in irrigation equipment.

An Economic Evaluation of Irrigation Strategies for Peanut. N.B. SMITH*, Department of Agricultural and Applied Economics, The University of Georgia, Tifton, GA 31793; J.P. BEASLEY, JR, J.E. HOOK, and J.A. BALDWIN. Department of Crop and Soil Sciences, The University of Georgia, Tifton, GA 31793.

Irrigation of peanut is a major production practice in Georgia. A University of Georgia irrigation survey estimated 56% of Georgia's peanut acres were irrigated in 2004. University of Georgia County Extension Agents have estimated over time peanut growers can experience up to a 1000 pound increase in yield due to irrigation. Irrigation costs typically range between $100 and $175 per acre depending on the size and type of system and number of applications. If costs fall in this range, irrigation has a good chance of paying for itself but the margin has grown thinner with lower prices. Production research has begun to focus on water conservation and efficiency of use. Recent irrigation trials conducted by the University of Georgia compared current and proposed irrigation strategies for peanuts. One objective of the research is to evaluate the economic efficiency of the

alternative irrigation strategies as measured by maximization net returns. Variable and fixed costs for irrigation have recently increased with rising fuel and metal prices. The rising costs coupled with lower peanut prices will mean growers who can minimize costs for an optimal return will remain competitive. Economic results averaged over three years and two locations are given for conventional and conservation tillage and compared for the optimal net return. Breakeven and sensitivity analyses are presented for each irrigation strategy.

Southeast Representative Peanut Buying Point Model: Analysis of Peanut Buying Points in Georgia, Florida and Alabama. A.S. LUKE-MORGAN*, A.E. MCCORVEY, Agricultural and Applied Economics Department, National Center for Peanut Competitiveness, The University of Georgia, Tifton, GA 31793-1209; S.M. FLETCHER, Agricultural and Applied Economics Department, National Center for Peanut Competitiveness, The University of Georgia, Griffin, GA 30223-1797.

The typical U.S. peanut producer relies heavily on a peanut buying point to handle and process peanuts throughout the grading process into the warehouse or to the desired destination point. The need for this dependence arises from the fact that most producers do not have the time during harvest to facilitate the cleaning and drying of their crop. Furthermore, it is not feasible for the average producer to facilitate these processes plus storage on their own given that peanuts are a semi-perishable crop. Therefore, the bulk of this responsibility is handled by the U.S. peanut buying points. Questions have arisen as to what costs are associated with handling and storing peanuts in today's environment. Thus, the National Center for Peanut Competitiveness surveyed the U.S. peanut buying point industry to analyze the costs associated with the handling and storage of farmer stock peanuts. A Southeastern representative buying point model was developed based on personal interviews and surveys of buying point operations throughout the Southeast. This representative peanut buying point model is used to develop pro-forma expense statements and to run various "what-if" scenarios to determine the potential impact on Southeast peanut buying points of various changes in prices or policy. Total costs and revenue for this representative Southeast peanut buying point are considered. A net loss of $9.05 per ton handled is realized for the representative Southeast buying point with an existing facility while a net loss of $35.11 per ton is realized for a new facility operation. If these losses persist, the economic viability of this sector is in jeopardy. For business operations to be viable, a return on investment or return to management is pertinent to maintain normal business operations and to remain in business.

Virginia-Carolina Representative Peanut Farms Established Through the National Center for Peanut Competitiveness. S.M. FLETCHER*, Agricultural and Applied Economics Department, National Center for Peanut Competitiveness, The University of Georgia, Griffin, GA 30223-1797; A.E. MCCORVEY, A.S. LUKE-MORGAN, Agricultural and Applied Economics Department, National Center for Peanut Competitiveness, The University of Georgia, Tifton, GA 31793-1209.

The mission of the National Center for Peanut Competitiveness (NCPC) is to enhance the competitiveness of U.S. peanut producers through product development, economics and production research in a global economy. An expansion of an on-going project that helps carryout this mission is the establishment of representative peanut farms in the Virginia-Carolina peanut region. Under this project twelve representative Southeastern peanut farms representing Georgia, Alabama, Florida and South Carolina have been developed. Three farms are being added to the database to capture peanut production trends in Virginia and North Carolina. The information gathered from these representative farms is used to analyze the impacts of potential adoption of alternative production technologies, environmental regulations, water usage and other potential changes in peanut production. Basically, any time an issue comes up from a regulatory- or policy-type avenue these model farms can be used to see how they'll be impacted. This type of information allows peanut farmers to know ahead of time how a particular issue might affect their operations, and, therefore, respond in a proactive way.

Impact of Energy Costs on the Financial Viability of Southeast Representative Peanut Farms. A.E. MCCORVEY*, A.S. LUKE-MORGAN, Agricultural and Applied Economics Department, National Center for Peanut Competitiveness, The University of Georgia, Tifton, GA 31793-1209; S.M. FLETCHER, Agricultural and Applied Economics Department, National Center for Peanut Competitiveness, The University of Georgia, Griffin, GA 30223-1797.

The National Center for Peanut Competitiveness carried out a study to determine the economic viability of the Southeast representative peanut farms over the period 2004 to 2008 given current economic conditions and baseline predictions for the future. Three financial factors were considered in the study. For each farm the probability of a cash flow deficit was determined. The probability of real net worth decline, i.e. the probability that a farm will have a loss in real net worth relative to the beginning net worth, was also determined. And, finally, given these two factors, the overall economic viability was determined with viability classified as good, marginal or poor. Two scenarios were considered for this study. First, costs as determined by panel members and adjusted by the FLIPSIM model were used. Second, given current world events and recent spikes in energy costs, fuel and fertilizers costs were adjusted to represent these increases. USDA reported agricultural input prices were used to determine the changes in fuel and fertilizer prices. This scenario compared current prices (December 2004) to

2002 average prices. Current diesel prices show an increase of 76% and gasoline an increase of 47% compared to the 2002 prices. Fertilizer costs were also increased to capture the effects of current energy costs on production. For peanuts, fertilizer costs were increased by 23%. Cotton fertilizer costs were increased by approximately 38% over 2002 costs and corn fertilizer costs were increased by approximately 45.5%. This study shows the forecast economic viability of Southeast representative peanut farms through 2008. Given the diversity seen in the representative farm database in crop mix, production practices, debt structure and yield potentials and forecasted factors such as prices, the future is not guaranteed for all Southeast peanut farms. When additional increased energy costs are imposed on the farms, the impact is even more detrimental to many farms' future.

BREEDING, BIOTECHNOLOGY, AND GENETICS II: VALUE ADDED TRAITS AND TOOLS FOR MANAGEMENT

Large Seeded Spanish Varieties as a Substitute for Runner-Type Peanuts in West Texas. M.R. BARING*, Soil and Crop Sciences Dept., Texas A&M University, College Station, TX 77843-2474; M.D. BUROW, Y. LOPEZ, Texas Agricultural Experiment Station, Texas A&M University, Lubbock, TX 79403; C.E. SIMPSON, Texas Agricultural Experiment Station, Texas A&M University, Stephenville, TX 76401.

We have developed high-oleic, large-seeded spanish lines for West Texas with seed size distribution patterns comparable to Flavorunner 458. The significance of this development is that spanish varieties, even the large-seeded spanish lines, are earlier maturing than the runner-type peanuts currently being grown in West Texas. Some of the runner-type peanuts grown in West Texas have been reported by manufacturers to have undesirable flavor profiles and other negative quality attributes such as high sugar and low fat content. Spanish peanuts grown in West Texas have not, for the most part, had these quality problems. Initial tests revealed that the large-seeded spanish lines may have the potential to fill the seed size distributions that are required by manufacturers which are currently being provided by runner varieties. Several lines are averaging 30 to 45% jumbo kernels, 40 to 55% medium kernels, and less than 15% number ones. Quality analyses have shown that on average selected, large-seeded spanish lines are ranked at 5.0 to 5.3 in roasted peanut flavor with 45.3 to 46.5% fat, and 4.6 to 5.0% sugar content. The top-yielding five lines tested to date ranged from 4392 to 6929 lbs./A depending upon the location of the test sites in West Texas.

Variation in Drought-Induced Protein Expression Among the Peanut Genotypes. S.M. BASHA*, R. KATAM, Division of Agricultural Sciences, Florida A and M University, Tallahassee, FL 32307; and K.S.S. NAIK, Agricultural Research Station, A.N.G.R. Agricultural University, Kadiri, 515591, India.

Water-stressed plants utilize a protection-based mechanism that activates the synthesis of specific transcripts and proteins during dehydration. We have monitored changes in protein expression between drought-tolerant and drought-susceptible peanut genotypes following water stress. Peanut genotypes with varying degrees of drought tolerance were subjected to water stress 110 days after sowing, for 7 to 28 days by withholding irrigation. Mature pods (Black and Brown category) were collected from the water-stressed and irrigated (control) plants, and changes in kernel protein and polypeptide composition were determined. Gel electrophoretic analysis showed that water stress significantly altered peanut seed protein/polypeptide composition. Drought-tolerant (DT) and drought-susceptible (DS) peanut genotypes responded differentially to water stress. Protein composition of DS genotypes changed significantly following water stress compared to the DT genotypes. Polypeptides with molecular weights around 14000, 22000, 25000, 37000, and 65,000 were greatly affected due to water stress. Based on the changes in polypeptide composition, peanut genotypes were grouped into three categories: 1. Drought-Tolerant: genotypes showing no change in polypeptide composition; 2. Moderately Drought-Tolerant: genotypes showing only moderate changes in polypeptide composition; 3. Drought-Susceptible: genotypes showing major changes in protein composition. Supported by USAID/PCRSP, FAM #51.

Sources of Variability for Agronomic Traits of West Texas-Grown Peanuts. M.D. BUROW*, Y. LÓPEZ, J. AYERS, Texas Agricultural Experiment Station, Texas A&M University, Lubbock, TX 79403; C.E. SIMPSON, Texas Agricultural Experiment Station, Texas A&M University, Stephenville, TX 76401; A.M. SCHUBERT, Texas Agricultural Experiment Station, Texas A&M University, Lubbock, TX 79403; M.R. BARING, Department of Soil & Crop Sciences, Texas A&M University, College Station, TX 77843.

Within West Texas, there is considerable variation for performance of varieties and breeding lines at different locations and years. This takes the form of differences in means and in overall variability within an experiment. We will examine the contributions of different factors (time, location, replications, and genotypes) to several traits, including yield and maturity in several recent experiments. A better understanding of these factors may contribute to more-effective experimental designs in the future.

Analysis of Expressed Sequence Tags for Peanut. M. GALLO-MEAGHER*, Agronomy Department, Plant Molecular and Cellular Biology Program, and The Genetics Institute, University of Florida, Gainesville, FL 32611-0300; K. CHENGALRAYAN, Agronomy Department, University of Florida, Gainesville, FL 32611-0300; W.G. FARMERIE, Interdisciplinary Center for Biotechnology Research, University of Florida, Gainesville, FL 32610; and S. MORRIS, Plant Molecular and Cellular Biology Program, University of Florida, Gainesville, FL 32611.

Unlike other major crops, few basic tools utilized in genomics are available for peanut (*Arachis hypogaea* L.). To date, peanut represents, at the molecular level, an under-explored section of the large and diverse legume family. As early and essential components of a peanut genomics toolkit, cDNA libraries and expressed sequence tag (EST) resources are being produced that sample gene expression in major organs during development. These ESTs can be exploited for gene discovery, genome annotation and comparative genomics. A cDNA library was constructed from developing seeds of field-grown Florunner. A total of 3699 clones were randomly selected, subjected to single-pass sequencing from the 5' end of the vector, and identified by sequence similarity searches against gene sequences in GenBank. Of these clones, 1642 represented unique sequences. Analysis of the identified clones displayed sequence similarity to a broad diversity of genes with a significant portion corresponding to seed storage proteins, some of which are known allergens. These results provide initial findings of gene expression in developing peanut seed.

Breeding Peanut with Resistance to Drought and Preharvest Aflatoxin Contamination. C.C. HOLBROOK*, B.Z. GUO, USDA-ARS, Tifton, GA; and D.M. WILSON, University of Georgia, Tifton, GA.

Peanuts become contaminated with aflatoxin when subjected to prolonged periods of heat and drought stress. Aflatoxin contamination costs the peanut industry over $20 million annually. The development of peanut cultivars with resistance to preharvest aflatoxin contamination (PAC) would reduce these costs. Two requirements are needed to breed a cultivar with resistance to PAC. First, we must have screening techniques that can reliably differentiate genetic resistance from susceptibility. During the course of this project, we have developed field-screening techniques that can measure genetic differences in aflatoxin contamination. The second requirement is genetic variation for resistance. During the course of this project, we have identified 11 core accessions that have shown at least a 70 % reduction in PAC in multiple environments. We have also identified a significant reduction in PAC in peanut genotypes with drought tolerance. These sources of resistance to PAC have been entered into a hybridization program. They have been crossed with cultivars and breeding lines that have high yield, acceptable grade, and resistance to tomato spotted wilt virus (TSWV). Due to the large environmental variation in PAC, it is not feasible to examine these breeding populations until late generations when there is

less heterozygosity and adequate seed are available for field testing using multiple replications. We have identified families and individual breeding lines that have relatively low PAC, relatively high yield, and acceptable levels of resistance to TSWV. However, much faster breeding progress could be achieved through the development and use of indirect selection techniques. We are exploring this with studies on mechanisms of resistance to PAC and attempting to develop molecular markers for resistance.

Application of the CSM-CROPGRO-Peanut Model in Assisting with Multi-Location Evaluation and Yield Stability Analysis of Peanut Breeding Lines. B. SURIHARN*, A. PATANOTHAI, K. PANNANGPETCH, S. JOGLOY, Department of Agronomy, Faculty of Agriculture, Khon Kaen University, Khon Kaen 40002, Thailand; and G. HOOGENBOOM, Department of Biological and Agricultural Engineering, The University of Georgia, 1109 Experiment Street, Griffin, GA 30223-1797.

Multi-location evaluation is a laborious, time consuming and expensive process in crop breeding programs. Crop simulation models can be used for environmental characterization of sites and to assist in evaluating the performance of genotypes over a wide range of environments. The objective of this study was to evaluate the potential of the CSM-CROPGRO-Peanut model in assisting multi-location evaluation and assessing yield stability of peanut breeding lines. Thirteen peanut lines and four check cultivars were used in this experiment. The multi-location trials were conducted at 13 environments in Thailand during the rainy and the post-rainy season of 2002 through 2004. The observed data from the yield trials and simulated data were compared and the means and ranks of the test entries and the correlation coefficients were determined. To examine the use of the crop model in the process of selection of peanut breeding lines, an additional 13 environments covering the sites that represented the main peanut production areas in Thailand were simulated. The results showed that the simulated values for first flower, maturity, pod yield and biomass were in good agreement with the data obtained from the actual yield trials. Ranks of site mean yields for the individual trials and corresponding simulated data were in good agreement for both pod yield and biomass. The model also predicted relative performances for pod yield and biomass of individual peanut lines very well and it was able to separate the high- yielding lines from the low-yielding lines for each environment. The correlation between the regression coefficients for pod yield of the individual peanut lines obtained from actual testing in the 13 environments and those obtained from simulated yield for the same 13 environments was significant ($r = 0.69^{**}$). However, they were somewhat different for those obtained from simulated data for an additional 13

environments for both pod and biomass. This indicated that the range of environments used for actual testing was insufficient to capture the responses of peanut breeding lines across the entry range of production environments in Thailand. The simulated data obtained for additional environments could be useful information for breeders to be able to evaluate yield performances of breeding lines over a wider range of environments than would be possible under the normal process of breeding line evaluation in a breeding program. This study showed that the CSM-CROPGRO-Peanut model can be a useful tool for assisting with multi-location evaluation and assessing yield stability of peanut breeding lines.

Predicting Oleic and Linoleic Acid Content of Single Peanut Kernels using Near-Infrared Reflectance Spectroscopy. B.L. TILLMAN*, D.W. GORBET, University of Florida, North Florida Research and Education Center, 3925 Hwy. 71, Marianna, FL 32446, and G. PERSON, University of Florida, Agronomy Department, 2062 McCarty Hall, Gainesville, FL 32611.

One objective of peanut breeding programs is to develop cultivars with elevated oleic acid content (<780 g kg $^{-1}$). The trait is reportedly governed by recessive genes, making it possible to select lines in early generations that will not segregate. Testing individual kernels for oleic acid (OA) content in early generation breeding material is possible using gas chromatography (GC), but the method requires cutting off a portion of the kernel which reduces germination. In addition to injuring the seeds, the method is time-consuming, requiring 20-30 minutes for each sample. Near infrared reflectance spectroscopy (NIR) has been evaluated in the University of Florida peanut breeding program as a method to rapidly screen individual peanut kernels for OA content. Using a NIR machine and related software, a calibration equation relating OA content measured with GC to OA content predicted by NIR was developed using single intact peanut kernels. The slope of the regression line of the OA content measured with GC (dependent) on the OA content predicted by NIR (independent) was 1.01 g kg $^{-1}$ (P>t<.0001) and the intercept was not different from zero. The coefficient of determination (R^2) was 98% with a root mean squared error of 16 g kg $^{-1}$. A validation set of peanut genotypes was tested and the slope of the regression of NIR predicted and GC measured OA content was 1.01 g kg $^{-1}$ and the intercept was not different from zero. The R^2 was 84% with a root mean squared error of 60 g kg $^{-1}$. By selecting seeds with at least 700 g kg $^{-1}$ NIR predicted OA content, only 5 of the 43 seeds in the validation set that were identified as having elevated OA content by GC would have been misclassified by NIR and no seeds without elevated OA content would be misidentified as having elevated OA content. This research shows that NIR prediction of OA and linoleic acid using intact peanut seeds is accurate, especially for early generation screening, and we estimate that NIR could save 15-20 minutes per sample compared to GC.

PLANT PATHOLOGY AND NEMATOLOGY II

Development of Early Leaf Spot in Peanut Intercropped with Corn or Cotton. B.B. SHEW*, Department of Plant Pathology, North Carolina State University, Raleigh, NC 27695; M.A. BOUDREAU, Herbert Green Agroecology, Asheville, NC 28804; and J. ACKLAND, Imperial College London, Wye Campus, Ashford, Kent, UK.

Early leaf spot epidemics were monitored on peanut intercropped with corn or cotton at the Peanut Belt Research Station at Lewiston-Woodville, NC. The peanut cultivars were NC-V11 in 2003 and Gregory in 2004. In both years, plots 16 rows (0.9 m spacing) wide by 15 m long were planted in four-row strips of unsprayed peanut/cotton or peanut/corn intercrops, or were planted entirely with peanut monocrops. Treatments included an unsprayed and a sprayed peanut monocrop. The sprayed plots were treated with 1.75 L/ha Bravo in 2003 or with 145 ml/ha Tilt + 1.17 L/ha Bravo in 2004. In 2004, additional treatments of peanut/cotton and peanut monocrop were sprayed twice early in the season (reduced spray). Early leaf spot was rated on the eight peanut rows of each plot beginning in early August. In both years of the study, AUDPC for early leaf spot was lower in the peanut/cotton intercrop than in the unsprayed peanut monocrop, but higher than in the sprayed peanut monocrop. Although both years were very favorable for leaf spot development, the reduction in AUDPC relative to the unsprayed control was greater in 2004 than in 2003. Intercropping corn with peanut did not suppress early leaf spot development. Peanut yields were severely depressed in all intercropping treatments in 2003 because digging was delayed following Hurricane Isabel, leading to pod shedding in these plots. In 2004, yields in the peanut/cotton intercrop were intermediate to those in the sprayed and unsprayed peanut monocrops. Comparison of disease progress in the reduced spray intercrop and reduced spray monocrop treatments suggested that intercropping delayed epidemic onset, but not the rate of disease progress. Results indicate that intercropping could be used as a means of suppressing early leaf spot, possibly in combination with other treatments that reduce AUDPC, such as host resistance, reduced tillage, and long rotations.

Relative Performance of Tebuconazole and Chlorothalonil for Control of Peanut Leaf Spot from 1994 through 2004. A.K. CULBREATH*, T.B. BRENNEMAN, R.C. KEMERAIT, and K.L. STEVENSON, Dept. of Plant Pathology, The University of Georgia, Tifton, GA 31793-0748.

Control of early leaf spot (*Cercospora arachidicola*) and/or late leaf spot (*Cercosporidium personatum*) of peanut (*Arachis hypogaea* L.) is critical for peanut production in the southeastern U.S., and is largely dependent upon use of the fungicides chlorothalonil and tebuconazole. The objective of this study was to monitor the relative performance of tebuconazole and chlorothalonil for leaf spot control since the registration of tebuconazole for use on peanut in 1994. Each year since

1994, multiple small plot field tests were conducted in Tifton and Plains, GA that included fungicide treatments of: i) tebuconazole 0.20 lb a.i./A (four applications of Folicur 3.6F in sprays 3 through 6 in a seven spray protocol, with chlorothalonil 1.12 lb a.i./A used for applications 1, 2, and 7); and ii) chlorothalonil 1.12 lb a.i. (seven applications of 720 g/L flowable or 82.5 % dry flowable chlorothalonil formulations in a seven spray protocol). The number of tests ranged from 5 in 1994 to 11 in 2001. All tests were of randomized complete block design with four or five replications. Cultivars used in the tests included Florunner, GK-7 and Georgia Runner in 1994 through 1997. Georgia Green was used predominantly from 1998 through 2003. In 2004, cultivars used were primarily Carver and Georgia 02C with one test planted to Georgia Green. Until 2004, the average final Florida 1-10 scale severity ratings for each year were either similar for the tebuconazole and chlorothalonil treatments, or were lower for the tebuconazole treatments. In 2004, the average final leaf spot severity rating across six tests was 8.2 for the tebuconazole block treatment, 5.9 for the full season chlorothalonil treatment, and 9.4 for the nontreated control. Trends were similar across tests at Tifton and Plains, and across cultivars Carver, Georgia Green, and Georgia-02C. However, differences between tebuconazole and chlorothalonil were more pronounced on the cultivar Carver, on which late leaf spot was especially severe. Results from 2004 are in stark contrast to final leaf spot severity ratings of 2.9, 5.1, and 9.3 for the tebuconazole, chlorothalonil, and control treatments, respectively, on Florunner in 1994.

Integration of Thiophanate Methyl Into Current Fungicide Programs in Georgia. R.C. KEMERAIT, JR.* and A.K. CULBREATH, Department of Plant Pathology, The University of Georgia, Tifton, GA 31794.

To manage leaf spot diseases of peanut caused by *Cercospora arachidicola* and *Cercosporidium personatum*, peanut growers in Georgia often make seven fungicide applications during a season. Once a component of such a program, the benzimidazole fungicide benomyl is no longer used after leaf spot pathogens developed resistance to the compound. A similar fungicide, thiophanate methyl, remains labeled for use on peanut. The objective of this study was to determine if commercial formulations of thiophanate methyl, Topsin M and Topsin 4.5F, enhance current fungicide programs in the management of leaf spot diseases. Fungicide programs that included the use of thiophanate methyl were assessed for control of leaf spot diseases in multiple field trials in 2003 and 2004. Topsin 4.5F was applied alone (10 fl oz/A) at applications 6 and/or 7 of a 7-spray program, or tank-mixed (10.0 fl oz/A) with four applications of Folicur 3.6F (7.2 fl oz/A) at sprays 3, 4, 5, and 6 in a 7-spray program. Topsin M (0.25 lb/A) was tank-mixed with chlorothalonil (Bravo WeatherStik, 0.75 pt/A) for 7 consecutive applications or tank-mixed with Folicur 3.6F (7.2 fl oz/A) at applications 3, 4, 5, and 6. A randomized complete block design with six replications was used in each study. Where thiophanate methyl was tank-mixed with Folicur 3.6F and compared to the standard Folicur program, the severity of leaf spot was significantly reduced, and

in one study yields were increased from 4091 lb/A to 4904 lb/A. Where Topsin 4.5F (10.0 fl oz/A) replaced the final two applications of chlorothalonil (Bravo WeatherStik, 1.5 pt/A) in a 7-spray Tilt-Bravo/Abound program, there was no significant change in yield, control of leaf spot, or control of southern stem rot. Where Topsin 4.5F (10.0 fl oz/A) replaced the final chlorothalonil application in a 4-block Folicur program, the severity of leaf spot was significantly reduced from 5.25 to 4.7; however there was no significant change in severity of southern stem rot or change in yield. Where Topsin M was tank-mixed with Bravo WeatherStik for seven consecutive applications, severity of leaf spot was significantly reduced from 6.0 to 3.5 on the Florida leaf spot scale.

Comparison of Abound 2SC Calendar and AU-Pnut Advisory Programs for the Control of Early Leaf Spot and Southern Stem Rot on a Disease Resistant Peanut Line. A.K. HAGAN*, H.L. CAMPBELL, and K.L. BOWEN, Dept. of Entomology and Plant Pathology, Auburn University, AL 36849; and L. WELLS, Wiregrass Research and Extension Center, Headland, AL 36345.

In 2002, 2003, and 2004, standard and modified AU-Pnut leaf spot advisories as well as 14-, 21-, and 28-calendar programs with Abound 2SC were compared for the control of early leaf spot and southern stem rot on a late maturing peanut cultivar with partial disease resistance. In 2002 and 2004, Florida C-99R was planted, while DP-1 was grown in 2003. Tillage, fertility, and weed control recommendations of ACES were followed. Temik 15G at 6.7 lb/A was applied in-furrow for thrips control. A RCB design with four replications per treatment schedule was employed. In addition to the above calendar schedules, fungicides were applied according to the standard 6/3 (number of rain events $\geq$0.10 inch to trigger first application/number of rain events to trigger subsequent applications) and modified 8/4 and 10/5 AU-Pnut advisory. In all calendar and advisory programs, applications of Abound 2SC at 18.3 fl oz/A were made approximately 60 and 90 DAP. Bravo Ultrex at 1.4 lb/A was applied in the remaining treatment slots in each program. Early leaf spot severity was assessed using the Florida leaf spot scoring system approximately 1 wk before plot inversion. Southern stem rot (SSR) loci counts were made immediately after plot inversion. Yields were adjusted to 10% moisture. Significance of treatment effects was tested by ANOVA and Fisher's protected least significant difference test (P=0.05). In 2 of 3 yr, the recommended 14-d calendar program gave better early leaf spot control than the other calendar and the AU-Pnut advisory programs. However, the 21- and 28-d calendar along with the AU-Pnut advisory programs often proved surprisingly effective in controlling early leaf spot on the Florida C-99R and DP-1 peanut. With one exception, defoliation levels for the latter calendar and advisory programs did not exceed 25%. In all three years, SSR incidence for the 14-d calendar program and the three AU-Pnut advisory programs was similar. Incidence of this disease was higher for the 21-d and 28-d calendar program in 2002 and 2003, respectively, compared to the 14-d calendar program. Yield response for the Abound AU-Pnut advisory programs was often equal to and sometimes better than that for the

recommended 14-d calendar program. Compared with the 14-d calendar program, two to four applications of Bravo Ultrex were saved with the 6/3, 8/4, and 10/5 AU-Pnut advisory programs. Although early leaf spot ratings were higher, yield for the 21- and 28-d calendar programs, which reduced the number of Bravo Ultrex applications by two and three, respectively, were similar to that for the 14-d Abound calendar program.

Effect of Fungicide Treatment and Pod Maturity on Peanut Peg Strength. J.W. CHAPIN*, and J.S. THOMAS, Department of Entomology, Soils, and Plant Sciences, Clemson University, Edisto REC, 64 Research Road, Blackville, SC 29817.

There are anecdotal reports that some peanut fungicides may physiologically enhance peg strength rather than merely suppress the diseases which can deteriorate peg strength. We tested eleven fungicide treatment programs for effects on the peg strength of harvest-mature pods (NC-V11 cultivar). Peg strength comparisons were also made for pods of different maturity categories based on mesocarp color. Fungicide programs were highly effective in preventing pod loss from late leaf spot and southern stem rot; thereby protecting yield (1,689-2,219 kg/ha greater than untreated check). However, none of the fungicide treatments had any measurable effect on the peg strength of healthy (disease asymptomatic) pods. Pods symptomatic for southern stem rot had peg strengths only about 45 % that of healthy pods. In contrast, pods symptomatic for tomato spotted wilt virus had significantly stronger pegs than those of healthy pods. Fully mature (black mesocarp) pods had peg strengths as great (6.70 ± 0.10 newtons) as the peg strengths of less mature brown, orange, or yellow mesocarp pod categories. Over-mature pods (characterized by a coal black mesocarp, tan-brown seed coat, and a slight anthocyanin pigmentation on the pod exterior) had significantly lower peg strength (2.22 ± 0.08 newtons) than all other maturity categories and pegs were only about 32% as strong as those of fully mature pods. Thus, in the absence of disease, we found no evidence of a decline in peg strength associated with advancing maturity until pods could be visually identified as over-mature. These results indicate that fungicide treatments should be based solely on disease efficacy rather than expectation of physiological peg strength enhancement. Similar studies on additional cultivars may also be useful in refinement of harvest timing recommendations based on the distribution of pod mesocarp color categories.

Fungal Diseases of Groundnut in Southern Ghana. E. MOSES*, J.K. TWUMASI, M. OWUSU-AKYAW, Plant Health Division, Crops Research Institute, P.O. Box 3785, Kumasi, Ghana; and R.L. BRANDENBURG, North Carolina State University, Raleigh, NC, USA.

Groundnut is an important food crop in Ghana. The seed is pressed for oil and the roasted nut is used in soups and other meal preparations. It is an important cash crop for several rural poor farmers and contributes

to food security in many farming communities in Ghana. Yields of groundnut in Ghana are below the reported yields from major producing countries. Late leaf spot (*Phaeoisariopsis personata*) and rust (*Puccinia arachidis)* were identified in farms in Ashanti and Brong-Ahafo regions of Ghana to be causing severe yield losses in 1998. Surveys were conducted in 1999 and 2001 in four regions in southern Ghana (Ashanti, Brong-Ahafo, Eastern and Volta) to document the incidence of fungal diseases and the need to develop control measures. Late leaf spot and rust were the major fungal diseases identified in the two surveys. Incidence of late leaf spot was present in the four regions in 1999 and 2001. The severity of late leaf spot ranged between 2.0 and 5.0 on a modified 1.0 to 5.0 scale in 1999. Incidence of rust in 1999 ranged between 72 and 83% with the highest incidence recorded in the Volta region. Incidence of rust in 2001 ranged between 30 and 75% in the four regions. The severity of rust was below 3.0 on a 1.0 to 5.0 scale. Farmers in the four regions cultivated largely two genotypes of groundnuts ('Konkoma' and 'China'), which are susceptible to late leaf spot. Poor pod filling is a common feature in plants with severe incidence of late leaf spot. Improved varieties with resistance to diseases are not available to farmers. Knowledge on groundnut diseases in southern Ghana was found to be inadequate among farmers. Currently, most of the farmers surveyed do very little for control of peanut diseases. Actions needed to improve disease control include screening genotypes for disease resistance, implementation of disease management practices, and training farmers to recognize diseases.

Plant Parasitic Nematodes Associated with Peanut Production in Southern Ghana. K. OSEI*, M. OWUSU-AKYAW, J.V.K. AFUN, J. ADU-MENSAH, F.O. ANNO-NYAKO, J.K. TWUMASI, E. MOSES, G. BOLFREY-ARKU, S. OSEI YEBOAH, M.B. MOCHIAH, I. ADAMA, CSIR-Crops Research Institute, Box 3785, Kumasi, Ghana; R.L. BRANDENBURG and D. JORDAN, North Carolina State University, Raleigh, NC, 27695, USA.

A survey was undertaken in 1999 and 2001 in predominant peanut growing areas in Ashanti, Brong Ahafo, Eastern and Volta regions of Ghana. The purpose was to identify the nematode pests of peanut and use the information for developing an appropriate integrated pest management (IPM) strategy for the crop. Ten genera of plant parasitic nematodes belonging to three Orders were found associated with peanut production in the areas surveyed. Population densities and distributions of the genera varied in the four regions. Six genera (*Helicotylenchus, Meloidogyne* (juveniles)*, Paratrichodorus, Pratylenchus, Rotylenchulus* and *Xiphinema*) were found in all the four regions. *Hoplolaimus* was found only in the Eastern region. *Trichodorus* and *Tylenchorhynchus* were absent from Ashanti and Brong Ahafo regions but present in the Eastern and Volta regions. A genus of nematodes known as *Rhignema*, which belonged to the Order Rhigonematida, was isolated from millipedes collected in the rhizosphere of peanut.

WEED SCIENCE

Uptake, Translocation, and Metabolism of Sulfentrazone in Peanut (*Arachis hypogaea* L.), Prickly Sida (*Sida spinosa*), and Pitted Morningglory (*Ipomoea lacunosa*). J.W. WILCUT*, W.E. THOMAS, S.C. TROXLER, L.R. FISHER, and W.D. SMITH. North Carolina State University, Raleigh, NC.

Studies were conducted to evaluate uptake, translocation, and metabolism of root-absorbed ^{14}C-sulfentrazone in peanut, prickly sida, and pitted morningglory. Peanut absorbed more than 5 and 3 times greater ^{14}C-sulfentrazone than pitted morningglory and prickly sida, respectively. All plant species translocated appreciable amounts ($\geq$ 39%) of radioactivity to the leaves. However, 13 and 16 percentage points more of the absorbed radioactivity remained in the roots of prickly sida and pitted morningglory, respectively, compared with peanut. The three plant species had some capacity to metabolize ^{14}C-sulfentrazone. At 3 hours after treatment, 7, 29, and 71% of the radioactivity in the shoots of peanut, prickly sida, and pitted morningglory, respectively, were sulfentrazone. Sulfentrazone levels in the shoots at 3 and 6 h after treatment correspond to reported tolerance levels with peanut being the most tolerant of the three species while prickly sida and pitted morningglory are moderately tolerant and completely susceptible to sulfentrazone, respectively. Levels of metabolites varied among species, plant part, and harvest timing. Based on these data, tolerance in peanut is partially due to the ability to metabolize sulfentrazone.

Peanut Response to AIM and ET. P.A. DOTRAY*, Texas Tech University, Texas Agricultural Experiment Station, and Texas Cooperative Extension, Lubbock, TX; T.A. BAUGHMAN, Texas Cooperative Extension, Vernon; and W.J. GRICHAR, Agricultural Experiment Station, Beeville, TX.

AIM (carfentrazone) may receive a Federal label for use in peanut in 2005. In 2004, Spartan 4F (sulfentrazone) was labeled for use in peanut in the southeast (Alabama, Georgia, North Carolina, South Carolina, Virginia, and Mississippi), but this label excluded states like Texas because significant injury has been observed. Both sulfentrazone and carfentrazone belong in the PPO family of herbicides. Until 2004, little university data had been collected on the use of AIM in peanut. Field experiments were conducted in 2004 to gain experience with AIM and ET, which is another PPO inhibitor manufactured by Nichino America. At Western Peanut Growers Research Farm (WPGRF) near Denver City and at the Agricultural Complex for Research and Extension Service (AG-CARES) near Lamesa, TX, AIM at 0.024 and 0.032 lb ai/A and ET at 0.00234 and 0.00313 lb ai/A (1.5 and 2.0 ounces of product per acre) were applied approximately 30 and 120 days after planting (DAP). Peanut injury was evaluated after each application and yield and quality determined at the end of the growing season. In order to ensure that plant injury and yield and quality loss was the result of an herbicide treatment, plots were maintained weed-free. At WPGRF, visual injury was observed following AIM and ET applied 30 DAP. This injury ranged from 22 to 47% following AIM

treatments and 33 to 48% following ET treatments 14 days after treatment. All injury decreased over time, but was still apparent at harvest (2 to 3%). Visual injury from applications made at 120 DAP did not exceed 7%. Peanut yield was not reduced following any herbicide treatment at this location. At AG-CARES, AIM and ET caused 47 to 62% and 35 to 40% injury 14 days after the 30 DAP treatments. Up to 5% injury was observed following the 120 DAP applications. Peanut yield was reduced following AIM at 2 ounces and ET 1.5 and 2 ounces applied at 30 DAP and following ET at 2 ounces applied at 120 DAP. Peanut tolerance and weed control studies using AIM and ET will be conducted in 2005 at several locations. At one location in south Texas, AIM and ET caused more injury (greater than 10%) when applied 35 and 63 DAP compared to applications made at 7 DAP (less than 8%). Plots treated with AIM at 1.5 and 2.0 ounces per acre 63 DAP produced the lowest yield. At a second location in south Texas, AIM and ET applied 35 DAP caused more injury (14 to 20%) than applications made at 97 DAP (4 to 8%). No differences in yield were noted between herbicide treatments at this location.

Carfentrazone for Peanut Weed Control. T.L. GREY* and E.P. PROSTKO. Department of Crop & Soil Sciences, The University of Georgia, Tifton, GA 31794.

Carfentrazone-ethyl is a aryl triazolinone herbicide that inhibits PROTOX enzyme. Carfentrazone is currently registered for preemergence and row-middle use in peanut but is not registered for postemergence application. No peanut postemergence efficacy data has been established. Therefore, a series of studies to establish carfentrazone peanut tolerance and weed efficacy were conducted in Georgia. The objective of this research was to evaluate the effects of carfentrazone applied at various times, on peanut injury, weed control, and yield. Replicated field trials were conducted at Attapulgus, Plains, and Tifton in 2003, and in Plains and Tifton in 2004. Test included carfentrazone at 8, 12, and 16 g ai/ha applied to peanut at cracking (AC) and at 3-leaf (POST) stage of growth. Additional test included carfentrazone at these same rates applied preharvest (PH) either 4, 2, 1, or 0 days before digging to evaluate peanut injury and effect on peanut desiccation. All treatments were applied with a nonionic surfactant. For early season peanut weed control in four studies, carfentarzone at any rate did not significantly injure peanut when applied as a true AC application. Carfentrazone injury was similar to paraquat for all studies. However, delaying application of carfentrazone to the POST stage of peanut resulted in variable peanut injury. In Plains in 2003 and Attapulgus in 2004, carfentrazone POST caused significant peanut injury that ranged from 30 to 50%, irregardless of rate, 6 to 12 days after treatment (DAT). Imazapic injury was 22% for these studies. By 15 DAT injury was less than 10% for all treatments in 2003 at Plains. In 2004 at Plains and Tifton, POST application carfentrazone injury was 5 to 17% 10 DAT. By June of each year, smallflower morningglory, *Ipomoea* morningglory, and wild poinsettia control was dependent on timing of application. Carfentrazone applied AC provided less than 50% control of these species 28 DAT. POST

applications provided 70 to 90% control of these species 15 DAT. Thus, control was reflective of the species emerged at the time of application. Carfentrazone rate was essentially independent of control with the 8 g/ha rate providing control similar to 16 g/ha. Yield was not reflective of early season carfentazone peanut injury as yields were similar for all treatments. POST applied carfentrazone resulted in unacceptable peanut injury. Carfentrazone applied 4, 2, 1, or 0 days PH did not injure peanut in two test over two years. No visible signs of desiccation or vine injury were noted. Inverted peanut moisture 24 hours after digging was not significantly different from the nontreated check (37%) for any treatment or timing of carfentrazone application. Peanut dry weights were not significantly different for the nontreated check (0.74 g/seed) for any treatment or timing of carfentrazone. Carfentrazone preharvest applications did not affect peanut when applied up to 4 day prior to digging and inversion.

Texas Panicum Interference in Peanut and Implications for Treatment Decisions. W.C. JOHNSON, III*, USDA-ARS, Coastal Plain Experiment Station, Tifton, GA 31793.

Trials were conducted from 2001 through 2003 to quantify the effects of Texas panicum (*Panicum texanum* Buckl.) interference on peanut yield, grade, and harvest losses. The experiments were located in fields with a heavy natural infestation of Texas panicum. One set of trials investigated the effect of Texas panicum densities on peanut. Texas panicum densities evaluated were weed-free, 1, 2, 4, 8, 16, and 32 plants/10 m row. These densities were established from natural infestations and thinned to the appropriate levels one week after peanut emergence. The other trials evaluated the duration of Texas panicum interference and effect of subsequent removal on peanut. All plots had Texas panicum densities of 8 plants/10 m row, established one week after peanut emergence. Texas panicum at this density was allowed to interfere with peanut until removal at 2, 4, 6, 8, 10, 12, 14, 16, 18, and 20 weeks after peanut emergence, in addition to a season-long weed-free control. Texas panicum was removed at the desired times with spot applications of sethoxydim. In both trials, maintenance weed control was a combination of cultivation, hand-weeding, and herbicides that were noninjurious to Texas panicum. Parameters collected were peanut yield, grade, and harvest losses. Peanut yields were reduced at a linear rate by Texas panicum, with every Texas panicum plant/10 m row reducing peanut yields by 24.1 kg/ha. At densities of 32 plants/10 m row, Texas panicum reduced peanut yields 20% compared to the weed-free control. Texas panicum densities had minimal effect on peanut grade. Harvest losses increased at a linear rate as Texas panicum densities increased. At densities of 32 plants/10 m of row, peanut harvest losses were 25% greater (120 kg/ha) than the weed-free control. In trials that evaluated the duration of Texas panicum interference from a population of 8 plants/10 m row, every week of Texas panicum interference reduced peanut yields by 40 kg/ha. Assuming a growing season of approximately 22 weeks, 20 weeks of Texas panicum interference at that density reduced peanut yields by 8% compared to controlling Texas panicum 2 weeks after emergence.

These data show the importance of effective Texas panicum control and the need to control the weed early in the growing season. Many peanut growers in the southeastern U. S. control escaped Texas panicum mid-season. These data show that peanut cannot fully recover from Texas panicum interference when the weed is controlled mid-season and yields are still reduced.

Influence of Planting Date on Peanut Response to Paraquat, 2,4-DB, and Plant Removal. D. JORDAN*, D. CARLEY, and D. JOHNSON, Department of Crop Science, North Carolina State University, Raleigh, NC 27695.

Planting date can have a significant effect on peanut pod yield and market grades. Research was conducted in North Carolina during 2003 and 2004 to determine if planting date influenced peanut response to paraquat applied approximately 28 days after peanut emergence or 2,4-DB applied in mid August. In an additional treatment for each planting date, approximately 40% of peanut plants were removed 28 days after peanut emergence. The cultivar VA 98R was planted approximately May 5, May 15, May 25, and June 5 during both years. Visual injury from paraquat and 2,4-DB was typical for these herbicides. Pod yield and market grade factors were influenced by planting date but not by paraquat and 2,4-DB or by removal of 40% of the peanut stand. These data suggest that recommendations on application timing of paraquat and 2,4-DB do not need to be adjusted when planting is delayed. These data also suggest that even though a significant number of peanut plants in the field were removed early in the season, peanut was able to compensate and yield was not reduced. As a cautionary note, these experiments were conducted under optimum growing conditions and in years when tomato spotted wilt was not apparent. Additional research is needed under situations when limited rainfall or other plant stresses are present that could influence peanut growth, pod maturation, and yield.

Influence of Cadre on Georgia Green Yield and Seed Germination. E.P. PROSTKO* and T.L. GREY, Department of Crop & Soil Sciences, The University of Georgia, Tifton, GA 31793.

Since its introduction in 1996, Cadre (imazapic) has become one of the most popular herbicides used for weed management in peanut production systems. In Georgia, it is estimated that 64% of the peanut acres are treated with this herbicide. Georgia Green is the most widely planted peanut cultivar in the southeast. When Cadre was originally developed, it was not tested on Georgia Green but on other varieties that were popular at that time including Florunner, Southern Runner, and GK-7. Additionally, limited research has been conducted to addresses the potential effects of postemergence herbicides on peanut seed germination. Therefore, the objective of this research was to evaluate the effects of Cadre, applied at various times, on the yield and seed germination of Georgia Green peanut. A small-plot replicated field trial was conducted at the Attapulgus Research and Education Center in 2004. Georgia Green peanut seed were planted in twin rows on May 13. Cadre at 1.44 ozs/A was applied postemergence at 8, 14,

22, 34, 41, 47, and 57 days after planting (DAP). All treatments included Agrioil at 1% v/v and were applied with a CO_2-powered backpack sprayer calibrated to deliver 15 GPA. The plot area was maintained weed-free using a preemergence application of Strongarm (diclosulam) + Prowl (pendimethalin) and hand-weeding. After digging but before combining, 100 pods from each plot were randomly collected. The seed from these pods were used to determine seed size and subjected to germinations tests at 68^0 and 77^0 F. Results of this study indicated that Cadre had no effect on peanut yield, seed size, or seed germination when applied at any time. Average seed size from treated and untreated plots was 58 grams /100 seed. Average seed germination at 77^0F was 94% from both treated and untreated plots. Average seed germination at 68^0F was 84% from the untreated plots and 86% from treated plots.

On-Farm Comparisons of Alternative Scouting Methods in Peanut. B.L. ROBINSON*, J.M. MOFFITT, G.G. WILKERSON, D.L. JORDAN, A. COCHRAN, J.R. PEARCE, R.W. RHODES, B.L. SIMONDS, L.P. SMITH, L.W. SMITH, C.E. TYSON, S.N. UZZELL and F.C. WINSLOW. Department of Crop Science, North Carolina State University, Raleigh, NC 27695; North Carolina Cooperative Extension Service, Raleigh, NC 27695.

Research on weed scouting methodology is needed in order to increase the existing knowledge about threshold-based weed management decisions in peanuts. Sixteen on-farm field trials were conducted in 2003 and 2004 to evaluate weed control in peanuts using four different scouting methods. County Extension personnel were provided travel money, new handheld computers, and extensive training sessions for use in the trials. Field plots ranged from 8 to 10 acres each, and were located on farms in eight peanut-producing counties in eastern North Carolina. The Extension agents contacted growers and arranged permission to conduct the research on their farms. Objectives of the research were focused on obtaining estimates for scouting times and determining quality of herbicide recommendations using the four scouting procedures, comparing herbicide recommendations made by the extension agent with those generated by the weed management decision support system HADSS^{TM}, and acquainting extension agents with HADSS while obtaining evaluations on performance. Different locations were scouted each year in each of the eight different counties resulting in sixteen unique locations. Three scouts (including the agent) scouted the peanut fields approximately three weeks after planting. Weed populations were estimated using four different methods: 1) windshield (standing on the edge of the field, each scout identified weed species and estimated population densities); 2) loop (each scout walked a loop through the field and estimated weed species and densities); 3) range (each scout recorded weed populations from six random spots in the field using a range from 1-5 where 1 was very low and 5 was very high); and 4) counts (each scout identified and counted weed populations from six random spots in the field). The Extension agent returned to the field two additional times during the growing season to monitor weed control. HADSS was used to determine the optimal

treatment for each field and expected net return for each available treatment. HADSS uses current market prices for peanut and herbicides, as well as estimated yield loss based upon weed competition, to determine expected net return. Count data from 18 randomly-selected spots in the field were used to determine the optimal treatment. Each scouting method was analyzed to determine accuracy (based upon $ lost/acre), and time required for completion. On average, the windshield method took 6 minutes to scout, the loop method 15, the range method 20, and the count method 30. The count method resulted in the fewest mistakes in treatment selection (2.0% loss on average), but was the most expensive method due to the time required (30 minutes). A less time-consuming and still fairly accurate method was the range method (7.5% loss) because it only took an average of 20 minutes to complete. Not surprisingly, the windshield method was one of the fastest and easiest ways to scout weeds, however in both 2003 and 2004 it was the most inaccurate scouting method (21% loss on average). In most cases, the agent agreed with the recommendations generated by HADSS, and at least one of the top 5 herbicide recommendations in HADSS corresponded with the agent recommendation.

Survey on Weed Management in Peanut Fields in Southern Ghana. G. BOLFREY-ARKU*, M. OWUSU-AKYAW, J.V.K. AFUN, J. ADU-MENSAH, F.O. ANNO-NYAKO, E. MOSES, K. OSEI, S. OSEI-YEBOAH, M.B. MOCHIAH, I. ADAMA, CSIR-Crops Research Institute, P. O. Box 3785, Kumasi, Ghana; and R.L. BRANDENBURG, D. JORDAN, North Carolina State University, USA.

A survey to determine farmers' practices, perceptions and weed management practices in peanut production was conducted in the Ashanti, Brong Ahafo, Eastern and Volta regions of Ghana in 2001. Peanut was planted as mono crop on 64 % of the fields. Forty one percent of the land was family owned while 33.3% was on lease. The choice of land preparation method seemed to relate to the land tenure system. The slash-burn method constituted 71.5 % and tractor ploughing, 25 %. In Brong Ahafo region, 80 % of the farmers planted on ridges while planting was on the flat in the Volta region while Ashanti and Eastern regions had a varied system. Cogongrass (*Imperata cylindrica*) was ranked as the worst weed by 40.7 % of the farmers and wild poinsettia (*Euphorbia heterophylla*), the second most important, by 37.5 % with densities ranging from 26-42 plt/m^2 and 25 – 110 plt/m^2 respectively. Farmers listed difficulty in weeding, competitiveness with crop, rapid growth and profuse seeding as the main reasons for the ranking. Generally, weed control was perceived as poor by 64.7 % of the farmers, fair by 23.5 % and good by 11.8 %. Majority of farmers (68.5 %) employed hired labour for weed control usually with the hoe but 4.3 % applied herbicides. Farmers perceived that peanut yield loss, due to untimely or inappropriate weed control, could be in the range of 21-80 %. Twenty –five per cent and 60% of farmers who either ploughed or slashed-burned and planted on flat reported of yield loss of 61-80%, while all the farmers who slash-burn and ridged reported losses of 41-60 %.

EXTENSION TECHNIQUES AND TECHNOLOGY/ EDUCATION FOR EXCELLENCE

Accuracy of Using Heat Units to Predict Peanut Pod Maturity During 2003 and 2004 in North Carolina. J. PEARCE*, North Carolina Cooperative Extension Service, Tarboro, NC 27886; D. JORDAN, P. JOHNSON, and D. CARLEY, Department of Crop Science, North Carolina State University, Raleigh, NC 27695-7620; and J. ALSTON, D. CALLIS, and T. CORBETT, North Carolina Department of Agriculture and Consumer Services, Lewiston-Woodville, NC 27849.

Heat unit accumulation and the number of growing degree days are used to predict crop maturity for peanut and several other agronomic crops. Research was established during 2003 and 2004 to compare peanut pod yield and market grade factors when the Virginia market type cultivar Gregory was dug weekly beginning in mid September and running through mid October. The number of growing degree days with a 56 degree F floor and 95 degree F ceiling (referred to as DD_{56}) was determined and correlated with the number of days required to reach optimum pod yield. In 2003, approximately 154 days after peanut emergence to digging were required to reach the highest yield over the six digging dates (2670 DD_{56}). In 2004 at the same location, approximately 130 days were required for peanut to reach the optimum yield over the six digging dates in three experiments (2626 to 2676 DD_{56}). Rainfall patterns at this location were similar between the two years, and a distinct drought period that would reduce plant growth and delay the maturation process was not evident. These data document the value of DD_{56} in predicting optimum maturity when rainfall is not a limiting factor. These results also indicate that 10 to 41% of maximum yield could be lost by digging one week early and that 10 to 21% of maximum yield could be lost by delaying digging one week past the optimum digging date.

Peanut CRSP Technology Adoption Rates: Report on a Survey of North Carolina Peanut Farmers. M. WILLIAMS*, A. COCHRAN, C. ELLISON, J. PEARCE, R. RHODES, M. SHAW, B. SIMONDS, L. SMITH, P. SMITH, C. TYSON S. UZZELL, A. WHITEHEAD, and F. WINSLOW, North Carolina Cooperative Extension Service, Raleigh, NC 27695; R. MOXLEY and G. THOMPSON, Department of Sociology and Anthropology, North Carolina State University, Raleigh, NC 27695-8107; D. JORDAN and T. ISLEIB, Department of Crop Science, North Carolina State University, Raleigh, NC 27695-7620; and R. BRANDENBURG, Department of Entomology, North Carolina State University, Raleigh, NC 27695-7613.

A sample of 417 North Carolina peanut farmers in 13 peanut growing counties were surveyed to determine the impacts of technologies developed and released by the Peanut Collaborative Research Support Program (PCRSP) project at North Carolina State University (NCSU). Data on technology adoption rates were gathered by a mail survey of

North Carolina peanut farmers. Adoption rates were computed for integrated pest management strategies, varieties planted from 1999-2003, and information sources. Also, data were gathered on production problems currently facing North Carolina peanut farmers and was used to suggest future research and extension activity. The main findings suggest that the variety NC-V 11 and weather-based advisories had the highest adoption rates. The Cooperative Extension Service publication series AG-331 *Peanut Information* was named most often as the "most useful" peanut production information source.

Validation of Current Calcium Recommendations on Peanuts. D.E. MCGRIFF*, Cooperative Extension Service, University of Georgia, Douglas, GA 31533, J.P. BEASLEY, J.A. BALDWIN, Department of Crop and Soil Sciences, University of Georgia, Tifton, GA 31793, E.J. WILLIAMS, Biological and Agricultural Engineering, University of Georgia, Tifton, GA 31793, F.J. CONNELLY, Cooperative Extension Service, University of Georgia, Nashville, GA 31639 and S. UTLEY, Cooperative Extension Service, University of Georgia, Ashburn, GA 31714.

Calcium (Ca) is the nutrient which is most often deficient in Georgia for peanut production. Application of gypsum at bloom has been the traditional method for supplying Ca in the pegging zone. Previous research in the 1980's has established Georgia's recommendation of 500 lb/acre Mehlich 1-Ca in the pegging zone for Florunner and GK-7 cultivars. This recommendation has not been validated on newer peanut cultivars.

Randomized treatments were replicated 3 to 4 times at three locations in Georgia in 2004 with three peanut cultivars- Georgia Green, a small-seeded runner; C-99R, a large-seeded runner; and Gregory, a Virginia-type. There were three Ca treatments on each cultivar (0, 800, and 1600 lbs/acre) at bloom. Soil samples to a depth of three inches were collected on all plots at planting, during pod development, and prior to harvest. They were analyzed for pH, K, Ca, and Mg. Pod yield was obtained and samples were collected for grade. Seed was saved and analyzed for Ca content and germination.

The Decline of Peanut Acreage in Southeast Virginia after the 2002 Farm Bill. G.R. SLADE*, Virginia Cooperative Extension, Surry, Virginia 23883.

With the passage of the 2002 Farm Bill the peanut "Quota" system was eliminated. During the previous Farm Bill the price of quota "Virginia" type peanuts was $610.00 per ton. With the 2002 farm bill the USDA loan price of peanuts fell to $355.00 per ton. Virginia - type peanuts are larger varieties that require additional inputs relative to runner-type varieties. Currently, few producers in Virginia grow runner-types. This decline in prices, coupled with increased production costs has resulted in reduction in peanut acreage and total number of farmers in southeast Virginia. Since 2001, acreage has gone from 75,000 to 32,000 acres in 2004. Over the past century, peanuts were the main cash crop for

many farm operations in southeastern Virginia. This change has affected the economics of southeastern Virginia as a whole including farmers, area shellers and processors, landowners, and local communities.

Fungicide Systems Effects on the Incidence of Peanut Disease. P.D. WIGLEY*, Calhoun County Extension Service, University of Georgia, Morgan, GA 39866; and R.C. KEMERAIT, Department of Plant Pathology, University of Georgia, Tifton, GA 31793-0748.

Field experiments were conducted to evaluate five fungicide systems for control of peanut disease during the 2002, 2003, & 2004 growing seasons. The systems that were evaluated included a four block Folicur program (sprays 3-6) with Bravo (Sprays 1,2,&7), Tilt-Bravo (Sprays 1 & 2) + Abound (Sprays 3 & 5) with Bravo (Sprays 4, 6 & 7), Abound (Sprays 3 & 6) + Moncut (Spray 5) with Bravo (Sprays 1, 2, 4, 5, &7), Artisan (Sprays 2, & 4) with Bravo (Sprays 1, 3, 4 – 7), Headline (Sprays 1a & 4) + Folicur (Sprays 3, 5 & 6) with Bravo (Spray 7). Treatments were applied according to manufacturers' recommendation and were compared to chlorothalonil alone. All treatments provided better control of rhizoctonia solani than the chlorothalonil only treatment. Among treatments the Tilt-Bravo + Abound system controlled rhizoctonia pod rot better than all other treatments. With the exception of the Tilt-Bravo/ Abound system all the treatments increased the control of white mold over the control. The curative properties of the Tilt-Bravo/Abound system may increase yields under certain conditions.

Challenges of Transitioning to Peanuts in a New Production Region of North Carolina. B. SPIVEY*, North Carolina Cooperative Extension Service, Jacksonville, NC; C. FOUNTAIN, North Carolina Cooperative Extension Service, Kenansville, NC; D. JORDAN, Department of Crop Science, North Carolina State University, Raleigh, NC 27695-7620; R. BRANDENBURG, Department of Entomology, North Carolina State University, Raleigh, NC 27695-7613; and B. SHEW, Department of Plant Pathology, North Carolina State University, Raleigh, NC 27695-7616.

Peanut acreage in the central coastal plain of North Carolina increased several fold from 2002 to 2004, and continued expansion of production in this region is expected. Challenges during this transition included: addressing issues associated with high zinc levels in some fields, long distance transportation of farmer stock peanut to buying points (70 miles in most cases), obvious mistakes with inoculation by *Brady rhizobium*, establishing sustainable crop rotations (grower's understanding of the importance of field histories associated with soybean and tobacco), crop rotation restrictions due to herbicide use, inexperience of growers, local agribusinesses not accustomed to supplying crop protection materials and equipment for peanut, unknown severity of pests, and unknown realistic yield potential for peanut in the region.

Utilizing Varieties as a Tool in Peanut Disease Management. T.B. TANKERSLEY*, Tift County Extension Coordinator, The University of Georgia, Tifton, Georgia, 31793; T.B. BRENNEMAN, The University of Georgia, Coastal Plain Experiment Station, Tifton, Georgia 31793; R.C. KEMERAIT, Department of Plant Pathology, The University of Georgia, Tifton, Georgia, 31793; J.P. BEASLEY, JR, Department of Crop & Soil Science, The University of Georgia, Tifton, Georgia, 31793; and J.A. BALDWIN, Department of Crop & Soil Science, The University of Georgia, Tifton, Georgia, 31793.

Peanut disease control is of major importance to growers across the peanut belt. Peanut rotation, fungicides and crop management decisions (planting date, tillage, timeliness, irrigation, etc*.)* are major tools that have been used to help in disease control. In recent years, new peanut varieties have been developed that offer some resistance and tolerance to certain peanut diseases. These new varieties have offered growers additional options in terms of yield, maturity length, kernel size and disease resistance. In Tift County in 1999, it was estimated that Georgia Green variety was planted on 94% of Tift County peanut acreage. In 2004, Georgia Green variety was planted on approximately 70% of peanut acres with 30% of the peanut acreage comprising recently released varieties. In recent research studies conducted in Georgia, varieties have shown significant differences resistance to certain peanut diseases and these varieties have been rated and given an index score for the 2005 Georgia Peanut Disease Risk Index. Tests conducted in Tift County have shown disease resistance differences and response to reduce fungicide schedules. In 2002, a new peanut variety, DP1, was evaluated for its disease resistance, yield and grade under three different fungicide spray programs. The trial included five replications in a randomized block design with three treatments. Treatment 1 included a minimum fungicide program, Treatment 2 a 50% reduced fungicide program and Treatment 3 was a full season fungicide spray program. Peanuts were rated for foliar and soil borne disease. Yield and grade data were collected for each treatment. Results indicated no significant differences in yield and disease ratings among the full spray and 50% reduced spray treatments. Significant yield and disease ratings differences were documented between the minimum spray treatment plots (treatment 1) and full and reduced treatments. In 2004, Georgia O1R was planted in a replicated plot design using two fungicide treatment schedules. Treatment 1 included a full fungicide program - (7 spray program) and Treatment 2 a reduced fungicide program – (4 spray program). Yield results indicated an advantage to the Treatment 1, however the net economic returns were similar on both treatments. Combined results indicate the following: 1) Certain peanut disease incidence can be reduced with the use of some varieties. 2) Disease control costs may be reduced through the use of certain varieties. 3) More research is needed to determine the best management approach for utilizing varieties in disease management.

Efficacy of Three Levels of Disease Control in a New Peanut Production Area. C.W. DAVIS, Jr.*, Senior Extension Agent, Calhoun County, P.O Box 161 St. Mathews, SC. J.W. CHAPIN, and J.S. THOMAS, Department of Entomology, Soils, and Plant Sciences, Clemson University, Edisto REC, 64 Research Road, Blackville, SC 29817.

With the end of the peanut quota system in the 2002 Farm Bill, peanut production has expanded into non-traditional areas in South Carolina. Calhoun County is one such area with no history of peanut production prior to 2003, but approximately 8,000 peanut acres in 2005. Many fields in Calhoun County have been in cotton monoculture without a recent history of soybean production. An on-farm experiment was conducted to demonstrate the efficacy and profitability of three levels of fungicide input on NC-V11 cultivar following six years of cotton production. The Level 1 program (foliar disease control only) consisted of Tilt 2 oz + Bravo 1 pt (0.056 lb propiconazole + 0.75 lb chlorothalonil) at 45 DAP, followed by Bravo 1.5 pt (1.125 lb chlorothalonil) at 60, 75, 90, and 105 DAP. The Level 2 program consisted of Tilt/Bravo at 45 DAP, followed by Abound 12 oz (0.2 lb azoxystrobin) at 60 DAP, Folicur 7.2 oz (0.2 lb tebuconazole) at 75 DAP, and Bravo 1.5 pt at 90 and 105 DAP. The Level 3 program was the same as Level 2 except that applications of Abound 12 oz and Folicur 7.2 oz were substituted for Bravo at 90 and 105 DAP. The experimental design was a randomized complete block with four replicates. Plots were 20 rows x 725', with the middle 12 rows harvested for yield. The Level 1 program had significantly less late leaf spot incidence than the other two programs. There were no measurable differences in southern stem rot or Rhizoctonia limbrot incidence. The Level 2 and Level 3 programs had significantly higher yields (+ 424 and 382 lb/ac, respectively) than the Level 1 program, indicating that some level of soil disease control is profitable even following long term cotton monoculture where soil disease symptoms may not be readily observed.

Soybean Thrips in Peanuts. B. EASTERLING*, Extension Agent-IPM, Texas Cooperative Extension, Pearsall, TX 78061; and N. TROXCLAIR, JR., Assistant Professor and Extension Entomologist, Texas Cooperative Extension-Research and Extension Center, Uvalde, TX, 78802.

Soybean thrips, *Sericothrips variabilis* (Beach) is a relatively new insect pest to South Texas and a new pest to peanuts *Arachis hypogaea* L. Currently no integrated pest management strategies or economic thresholds exist for this pest. Little is known on this pest, its feeding habits, and disease transmission, primarily Tomato Spotted Wilt Virus (TSWV) in South Texas. An insecticide trial was established in 2004 to evaluate the efficacy of several insecticides for control of soybean thrips in peanuts.

BREEDING, BIOTECHNOLOGY, AND GENETICS III: GERMPLASM RESOURCES

Stability of Valencia Peanut Genotypes at New Mexico and West Texas.
N. PUPPALA*, N. MANIVANNAN, New Mexico State University, Agricultural Science Center at Clovis, 2346 SR 288, Clovis, NM 88101 and S.G. DELIKOSTADINOV, Institute for Plant Genetic Resources, Sadovo, Bulgaria.

Valencia peanut production in the western high plains is variable due to environmental variation in this region. At present there are only seven varieties that are commercially available to the growers. Fourteen Valencia peanut genotypes consisting of commercial and experimental lines were tested across eastern New Mexico (Clovis and Portales) and west Texas (Sudan, Brownfield and Denver City) at five locations during May - Oct, 2004. Each entry was sown in a 9 m^2 plot with three replications adapted to a randomized block design. Observations were recorded on five randomly chosen plants for eleven characters, namely dry matter production per plant, harvest index, plant height, number of pods per plant, pod weight per plant, kernel weight per plant, hundred kernel weight, shelling percent, per cent of one seeded pods/plant, per cent of two seeded pods/plant and per cent of 3 and more seeded pods/plant. The data were subjected to stability analysis following the AMMI model suggested by Gauch et al. (1988).

Analysis of variance for the AMMI model suggested that all characters showed significant variances due to genotypes and environments against error variances. The variances due to genotype X environment recorded significance against error variances for all characters except shelling per cent. The variances due to PCA1 ranged from 2.6 to 26.4 with significance while the variances due to the residual ranged from 0.7 to 1.8.

Among the genotypes, NM02565 (100 g/plant) had significantly superior pod weight per plant compared to check varieties Valencia A (66 g/plant) and Valencia C (70 g /plant). The genotype NM02565 gave 51 and 42 per cent higher pod yield per plant than Valencia A and Valencia C. This genotype also showed significantly superior kernel yield per plant (67 g/plant) than the check varieties Valencia A and Valencia C. NM02565 showed high and positive interaction with environments. The environments Brownfield and Sudan showed negative and positive interaction for pod yield and kernel yield per plant. Among the environments, Brownfield and Clovis had higher interaction effects than other environments. The genotype NM02565 also showed on-par performance for pod number and proportion of pods with 3 and more seeds per plant and other characters, and superior performance for hundred kernel weight when compared to the Valencia A and C. Hence, this genotype shows significant higher pod yield and looks to be a promising line for eastern New Mexico and west Texas.

Description Information on Eleven new *Arachis* Species. C.E. SIMPSON*, J.F.M. VALLS, A. KRAPOVICKAS, D.E. WILLIAMS, I.G. VARGAS, and R.F.A. VEIGA. Texas Agr. Exp. Stn., Texas A&M Univ., Stephenville, TX 76401; EMBRAPA/CENARGEN, Brasilia, Brazil; IBONE, Corrientes, Argentina; Foreign Agricultural Service, USDA, Washington, DC; Museo de Historia Natural Noel Kempff Mercado, Santa Cruz, Bolivia; IAC, Sao Paulo, Campinas, Brazil.

We have recently submitted for publication the botanical descriptions of eleven new species of wild *Arachis* that were collected in Brazil, Bolivia, and Paraguay between 1903 and 2002. These species represent six of the nine sections of the genus. Section *Extranervosae* is represented by *A. submarginata* Valls, Krapov. & C.E. Simpson, collected near Agua Boa, Mato Grosso, Brazil. Section *Heteranthae* is represented by *A. interrupta* Valls & C.E. Simpson from Minas Gerais, and *A. seridoënsis* Valls, C.E. Simpson & Veiga from Rio Grande do Norte, both in Brazil. Section *Erectoides* is represented by *A. porphyricalix* Valls & C.E. Simpson which has only been collected at one site near Uberaba, Minas Gerais, Brazil. Section *Procumbentes* is represented by *A. Hassleri* Krapov., Valls & C.E. Simpson, first collected in 1903 near Concepcion, Paraguay, and *A. Pflugeae* C.E. Simpson, Krapov. & Valls from Mato Grosso do Sul, Brazil, and from Concepción, Paraguay. Section *Rhizomatosae* (*Eurhizomatosae*) is represented by *A. nitida* Valls, Krapov. & C.E. Simpson from Brazil and Paraguay, and is the only species of this section that has produced a flowering hybrid when crossed with a species of section *Arachis* (*A. Batizocoi*). Section *Arachis* is represented by four of the new species: *A. linearifolia* Valls, Krapov. & C.E. Simpson from Mato Grosso, Brazil, *A. Schininii* Krapov., Valls & C.E. Simpson known only from the type locality in Amambay, Paraguay, *A. Gregoryi* C.E. Simpson, Krapov. & Valls from Mato Grosso, Brazil, and *A. Krapovickasii* C.E. Simpson, D.E. Williams, Valls and I.G. Vargas from Santa Cruz, Bolivia. This last species, when grown in cultivation, has the largest leaflets of the genus, and the fruits are also very large and reticulate. These latter two species, *A.Gregoryi* and *A. Krapovickasii,* form part of the B-genome group within section *Arachis*, and may aid in the understanding of the B genome of *A. hypogaea* L. The eleven newly described species contribute significantly to the panorama of wild *Arachis* diversity, complementing the 68 wild species recognized in the Krapovickas and Gregory monograph of 1994. Description of the new species facilitates their study and conservation and opens the way to their use in crop improvement.

Supporting Evidence of the Evolution of Cultivated Peanut through Crossability Studies involving *Arachis ipaënsis*, *A. duranensis,* and *A. hypogaea.* A.P. FAVERO*, C.E. SIMPSON, J.F.M. VALLS, and N.A. VELLO. Embrapa Genetic Resources and Biotechnology, SAIN Parque Estação Biológica, CP 02372, 70.770-900, Brasília, DF, Brazil; Texas Agric. Exp. Stn., Texas A&M Univ., Stephenville, TX 76401, USA, Department of Genetics - Escola Superior de Agricultura “Luiz de Queiroz” ESALQ/ USP, C.P. 9, 13418-900, Piracicaba, SP, Brazil, supported by a CNPq Fellowship.

Genus *Arachis* includes 69 described species, of which 27 belong to section *Arachis*. This section harbors *A. ipaënsis* Krapov. & W. C. Gregory and *A. duranensis* Krapov. & W. C. Gregory considered from molecular data to be the putative parents of the cultivated peanut (*A. hypogaea L.*). Our work contributes to the study of evolution of the peanut based on the successful hybridization between *A. ipaënsis* and *A. duranensis*, chromosome doubling of the hybrid, and crosses between the synthetic amphidiploid with representatives of the diversity of the crop. From 24 pollinations between *A. ipaënsis* and *A. duranensis*, five hybrid plants were obtained, with a percentage of success of 20.83%. All diploid hybrids were confirmed by molecular markers. Pollen stain of the hybrids was 0.98%. Colchicine treated hybrid cuttings were confirmed as tetraploids by mitotic chromosome counting. Plants from seed harvested from colchicine duplicated hybrid pots (*A. ipaënsis* x *A. duranensis*)^{x2} had 97.74% pollen staining. There were significant differences in structure dimensions measured in diploid and tetraploid flowers, except in the upper lip length. Hybrid individuals [*A. hypogaea* x (*A. ipaënsis* x *A. duranensis*)^{x2}] were produced from crosses involving all six botanical varieties of *A. hypogaea.* The hybrids produced by *A. hypogaea* x [amphidiploid *A. ipaënsis* x *A. duranensis*] indicate the evolutionary similarity between those wild species considered together and the crop species. Successful hybridization between *A. ipaënsis* and *A. duranensis* at the diploid level, complemented by the successful hybridization between *A. hypogaea* and the synthetic amphidiploid provide strong supportive evidence that these two diploids are the parents of the cultivated peanut, broadly supported by an array of investigative approaches. The resulting hybrid materials from this study are of great importance to the peanut breeding program.

Hybrids between *Arachis hypogaea* and *A. kretschmeri* from section *Procumbentes*. N. MALLIKARJUNA*, D. JADHAV and S. CHANDRA. International Crops Research Institute for Semi Arid Tropics, Patancheru 502 324, Andhra Pradesh, India.

We have successfully crossed *Arachis hypogaea* with *A. kretschmeri* (ICG 8191; PI 468151; collector number 30007, Oklahoma number 3692), a wild species from section *Procumbentes*. *Arachis kretschmeri* is a wild species endemic to Mato Grosso do Sul province of Brazil and has desirable characters such as resistance to late leaf spot and rosette disease of groundnut. Hormone-aided pollinations followed by embryo rescue technique was essential to obtain hybrids. The percent pollination to pod formation was low but the hybrids were fertile and pollen fertility ranged between 9 -18 %. F_1 hybrids were backcrossed to *A. hypogaea* and BC_1 hybrids were produced through embryo culture. Simple sequence repeat (SSR) markers were able to distinguish between the parents and the hybrids. This is the first report of successfully crossing *A. hypogaea* with *A. kretschmeri.*

ECONOMICS II

The Economics of Aflatoxin Reduction in Benin Using Recommended Practices. D.S. VODOUHE*, University of the Republic of Benin, R. VODOUHE, International Institute of Tropical Agriculture, Benin, and C.M. JOLLY, Auburn University, Auburn, Alabama 36849.

Groundnut is considered as an important food nutrient source for the people of Benin. Groundnuts cover 5% of caloric intake, 8.5% of protein, and 20.5% of lipid needs in Benin (Adomou 1999). Groundnuts also play a significant role in animal feed in Benin. Unfortunately, production of aflatoxin (AF) free groundnuts is one of the constraints identified in Benin. Previous research revealed that the presence of *Aspergilus flavus*, a fungus that may produce AF in groundnuts, is common (Adomou 1999; SOFRECO 1996). The AF levels can be reduced by proper post harvest handling that includes proper drying, selection and storage. We selected groundnuts from 8 farmers in three production zones in Benin. We used recommended post harvest handling techniques versus the traditional farmers' practices to reduce AF levels. We measured costs from digging, selection, drying and storage for the recommended versus traditional practices. The costs for reducing AF levels to the recommended WHO level (20 ppb) were considerable high. Labor costs for selection and handling was twice as high for the recommended practices as for the farmers' practices. Labor costs for selection made up 55 % of all costs for the recommended storage practice. If farmers were to reduce the moisture level to less than 12 %, as recommended, the cost of reduction of AF levels for the traditional post harvest handling would be as effective as that of the recommended practices.

An Economic Analysis of Peanut Production Risk in Bulgaria. C.M. LIGEON*, Auburn University at Montgomery, N. BENCHEVA, Agricultural University in Podiv, Bulgaria, S. DELIKOSTADINOV, Institute of Plant Genetic Resources in Sadavo, Bulgaria, C.M. JOLLY, Auburn University, Auburn, Alabama, and N. PUPPALA, New Mexico State University.

Bulgaria is the most important producer of peanuts in Europe. In 2001-2002, Bulgaria contributed 97% of all peanuts produced in Europe. Production and yields have increased in the past five years but varied temporally and spatially. In spite of the rapid increases in production, the risk associated with production has not been evaluated. The production risk of growing peanuts in Bulgaria was measured by using a Just-Pope production function. The Just-Pope production function allows for the estimation of the first two moments, the mean and the variance for peanut yield. The data for this study came from a survey of 202 farmers from different peanut producing regions in Bulgaria. A quadratic functional form was used for the Just-Pope production function. Production was expressed as a function of fertilizer, pesticides, seeds, capital investments and labor. The R^2 for the estimated model was 0.98, while the factors phosphate, seed, capital, fungicide, manual and mechanized labor were all significantly different from zero. The R^2

for the model that estimated the variability of peanut yield was 0.93, while seed and phosphate were the two factors that contributed to the variability of peanut yield in Bulgaria.

Socio-Economic Survey on Integrated Pest Management Practices on Peanut Production in Some Villages in the Ejura-Sekyedumase District of Ashanti Region, Ghana. A.A. DANKYI*, M. OWUSU-AKYAW, V.M. ANCHIRINAH, J. ADU-MENSAH, M.B. MOCHIAH, E. MOSES, J.V.K. AFUN, G. BOLFREY-ARKU, K. OSEI, S. OSEI-YEBOAH, I. ADAMA, CSIR-Crops Research Institute, P. O. Box 3785, Kumasi, Ghana; R.L. BRANDENBURG, and D. JORDAN, North Carolina State University, USA.

The study collected baseline information on farmers who cultivated peanut and were involved in farmer field school activities in the study area. Three villages where farmer field school (FFS) had been organised were purposively chosen. In a total sample of 90 peanut farmers, selected at random from three villages, a formal survey with prepared questionnaires was administered. Majority of the farmers (92%) planted peanut as monocrop and cultivated one field at a time. Majority of the farmers planted old improved varieties. Thirty-five percent of the farmers planted their peanut in rows. Sixteen percent of the farmers were found to be involved in FFS activities. Farmer field school has been recent as 11% of the farmers reported attending FFS in 2002 and 2003 coinciding with the year IPM farmer school began in the area. There were significant differences between FFS participants and non-participants in the testing of seeds before planting, row planting, ability to recognize foliar pests and diseases. Farmer field school participants were better informed than their non-participant counterparts. The Integrated Pest Management (IPM) FFS has the potential of helping farmers to increase the peanut production by transferring improved technologies to them. Although the IPM FFS began not long ago, it has begun to have some impact.

Factors Influencing Decision to Sort Peanuts in Ghana. R.T. AWUAH*, S.C. FIALOR, Kwame Nkrumah University of Science and Technology, A.D. BINNS, Cahaba Safeguard Administrator (LLC), J.M. KAGOCHI and C.M. JOLLY, Auburn University, Auburn, Alabama, 36849.

Groundnuts (*Arachis hypogaea L*.) play an important role as a source of protein and fat in most of the developing countries, especially Ghana. However, groundnuts, stored and marketed under poor climatic conditions, are often contaminated with aflatoxin (AF). AF is among the most potent toxic substances that occurs naturally and is a major hazard to human health. Though it may be difficult to eliminate AF from groundnuts, one of the recommended methods of reducing it is through sorting at all levels of the marketing chain. We developed logistic regression models to investigate factors that influence market participants' decision to sort groundnuts before consumption and processing in Ghana. Model results show that farmers' decision to sort groundnuts before consumption was influenced by gender, education,

age, number of dependents assisting, knowledge of health problems associated with consuming AF contaminated groundnuts, total revenue per acre of groundnuts, and the form in which the groundnuts are eaten. Livestock owners' decision to sort before consumption was influenced by education and the form in which the groundnuts are consumed. The level of education of consumers, and the form in which the groundnuts are consumed influence consumer's decision. Farmers' decision to sort the groundnuts before converting it into paste was influenced by the number of dependents assisting, the revenue from groundnuts and the form in which the groundnuts are consumed. The form in which the groundnuts are consumed and knowledge of the health effects of AF influenced livestock owners, retailers and consumers decision to sort before processing into paste. Processors' decision to sort before conversion into paste was influenced by education, knowledge of the reasons for sorting and the form in which groundnuts are consumed.

Groundnut Consumption Frequency Decisions in Ghana. C.M. JOLLY*, J.M. KAGOCHI, Auburn University, Auburn Alabama 36849, R.T. AWUAH, S.C. FIALOR, Kwame Nkrumah University of Science and Technology, and A.D. BINNS, Cahaba Safeguard Administrator (LLC).

Groundnuts is an important food item in the diets of most Ghanaians. Groundnuts are eaten in numerous forms. We conducted a study to investigate the frequency of groundnut consumption by Ghanaian farmers, livestock owners, processors and retailers'. Logistic models were developed to determine factors influencing consumers' decision to eat groundnuts. The results of the analysis indicated that most stakeholders consume groundnuts/product at least once or thrice a week. About 80% of respondents consumed groundnuts at least once a week, while 32.0% consumed it three times a week. Only 13.9% of respondents rarely eat groundnuts. Processors had the largest number of respondents who consumed groundnuts daily (29.3%) while millers had the lowest (6.7%). The highest per capita consumption is by individuals who raise livestock. Such individuals have an average per capita consumption of 0.94 kg/wk followed by the farmers with a per capita consumption of 0.93 kg/wk. Feed millers consumed the least groundnuts (0.15kg/wk) relative to the average per capita national consumption of 0.61 kg/wk. The logistic models showed that age, education and the form in which groundnuts are consumed influence whether consumers eat groundnuts more than or less than three times per week. Farmers' decision to consume groundnuts is influenced by total revenue, and the form in which the groundnuts are eaten. The frequency with which groundnuts are eaten by livestock owners is influenced by livestock owners' decision as to whether the groundnuts affect the health of their animals and the form in which the groundnuts are eaten. Processors frequency of consumption is affected by form in which groundnuts are consumed and their knowledge of sorting. Retailers' level of consumption was influenced by age, forms in which the groundnuts are consumed and the knowledge of reasons for sorting.

MYCOTOXINS/PHYSIOLOGY AND SEED TECHNOLOGY

Impact of Crop Rotation on Aflatoxin Contamination in Peanut. K.L. BOWEN*, A.K. HAGAN, and H.L. CAMPBELL. Dept. Entomology and Plant Pathology, Auburn University, AL 36849.

Previous studies have indicated that plant parasitic nematodes can affect aflatoxin contamination of peanut, and cropping sequence does affect plant parasitic nematode populations. In 2004, soil and peanut pods were sampled from plots that were part of a rotation study located in southeastern Alabama that has been in place for 16 years. Crop rotation sequences include continuous peanuts, peanuts in alternating years with corn, cotton and bahiagrass, peanuts following two years of bahiagrass, and peanuts following three years of bahiagrass. Soil samples were assayed for nematodes; pod samples were assayed for visible damage and aflatoxin content. Each of these sequences was replicated four times. Rotation sequences have also been designated by quality as poor (= continuous peanuts), fair (peanuts cropped in alternate years), good (two years to crop other than peanut) and excellent (three or more years between peanut crops). Root-knot nematodes were found in all sampled plots at very high populations (larval counts ranged from 400 to 2200 per 100 cc soil). Poor rotations had significantly lower populations of root-knot nematodes (mean = 558) than rotation sequences of other qualities (means = 1764, 1654, and 1540 for excellent, good, and fair, respectively). Aflatoxin B_1 levels that were detected in pod samples were generally low (< 10 ppb), which is attributable to regular rainfall during the peanut growing season. No significant differences in aflatoxin levels were found due to rotation; however, a significant Spearman's rank correlation was observed between aflatoxin B_1 levels and nematode populations.

Commercial Production and Use of Afla-Guard® for Biological Control of Aflatoxin Contamination in Peanuts. J.W. DORNER, USDA, ARS, National Peanut Research Laboratory, Dawson, GA 39842.

Prior research has led to development of a product that effectively reduces aflatoxin contamination of peanuts. The active ingredient is a nontoxigenic strain of *Aspergillus flavus* that competitively excludes toxigenic strains present in soil in the infection and colonization of peanuts. Spores of the nontoxigenic strain are coated onto the surface of hulled barley, which is applied to peanut fields at a rate of 22.4 kg/ha. After application, the nontoxigenic strain grows and sporulates on the surface of the barley, thus inoculating the soil. The coated barley formulation was given the trade name, afla-guard®, and it received EPA Section 3 registration as a biopesticide in May, 2004. Approximately 50 tons of afla-guard® was produced by Circle One Global, Inc., in 2004, and growers in Georgia and Alabama applied it to approximately 5000 acres of peanuts. Soil samples were collected from representative treated and untreated fields prior to digging to determine the establishment of the nontoxigenic strain in treated soil. In addition, grade samples (1.5-2.0 kg) of harvested peanuts were collected at various buying points from 178 and 404 loads of untreated and treated peanuts, respectively. Samples were shelled, ground in a vertical cutter

mill, and analyzed for aflatoxin by liquid chromatography. Application of afla-guard® resulted in an average change in the ratio of toxigenic to nontoxigenic strains of *A. flavus* in soil from 2.5:1 to 1:24. Aflatoxin in farmers' stock peanuts from all locations was reduced from a mean of 78.9 µg/kg in untreated peanuts to a mean of 11.7 µg/kg in treated peanuts (85.2% reduction). Not only was the mean aflatoxin reduced, but the percentage of loads containing high levels of aflatoxin also was reduced similarly. Sixteen percent of loads from untreated fields contained > 100 µg/kg of aflatoxin compared with only 2% of loads from treated fields (87.5% reduction). The study demonstrated that commercial use of the biological control technology was as effective in reducing aflatoxin as has been demonstrated experimentally.

Determinants of Aflatoxin Levels and Health Effects in Ghana. P.E. JOLLY*, Y. JIANG, F. OBUSEH, Department of Epidemiology, University of Alabama at Birmingham, Birmingham, AL 35294-0022; W.O. ELLIS, R. AWUAH, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana; J-S. WANG, Department of Environmental Toxicology, Texas Tech, Lubbock, TX 79409-1163; T. PHILLIPS, College of Veterinary Medicine, Texas A&M, College Station, TX 77843-4458; C. JOLLY, Department of Agricultural Economics and Rural Sociology, Auburn University, Auburn, AL 36849-5046; and J. WILLIAMS, College of Agricultural and Environmental Sciences, University of Georgia, Griffin, GA 30223.

Aflatoxins are potent of carcinogens found in foods, especially in groundnuts, maize and other oil seeds. Chronic exposure to aflatoxin causes liver tumors and immune suppression in a number of animal species and is associated with hepatocellular carcinoma in humans. We conducted a cross-sectional study on the association between aflatoxin levels and various socio-demographic, health and immune characteristics of people in the in a heavy maize and peanut consuming area of the Ashanti Region of Ghana. We found high aflatoxin B1 albumin adduct levels (AFB1) in the plasma (mean ± SD = 0.89 ± 0.46 pmol/mg albumin) and high AFM1 levels in the urine (mean ± SD = 1,800.14 ± 26.02 pg/mg creatinine) of the majority of the study participants. Several socio-demographic factors, namely, educational level, ethnic group, the village in which participants lived, number of individuals in the household, and number of children in the household attending secondary school were found to be significantly associated with AFB1. With regard to health history/status, participants who had experienced yellowing of the mouth (a sign of jaundice) and those who had a history of painful vomiting had significantly higher levels of AFB1 than participants who had not experienced these conditions. Almost one quarter (24%) of study participants had low vitamin A (retinol) levels (≤20 µg/dL) and 71% had low vitamin E levels (≤0.05 mg/dL). With regard to AFB1 and retinol, a significantly higher proportion of study participants with high AFB1 levels had low levels of retinol compared to those with low AFB1. Study participants with high AFB1 levels also had significantly lower mean percentages of activated CD3 and CD19 (CD3+CD69+ and CD19+CD69+) cells and CD8+ T cells that contained

perforin, or both perforin and granzyme A, than participants with low AFB1. These alterations in immunological parameters in participants with high AFB1 could result in impairments in cellular immunity that could decrease host resistance to infections. These findings indicate strongly that there is need for specifically designed interventions to reduce aflatoxin exposure in people in this region of Ghana.

Integrated Strategies to Address Aflatoxin Contamination of Peanut in Senegal. A. GUIRO, and KANE*, Institut de Technologie Alimentaire, BP 2765, Hann, Dakar, Sénégal.

Aflatoxins are secondary metabolites secreted mainly by *Aspergillus flavus* strains that thrive in agricultural products such as oilseeds including peanuts. Aflatoxins are toxic to humans and animals and pose serious health and economic problems in Senegal where peanuts are grown on more than 70% of the arable lands. Peanuts are major exported products in Senegal since the seventies and eighties. Recent legislations in developed countries requiring lower aflatoxin levels in exported peanut, the Senegalese government has encouraged research and outreach for controlling aflatoxin. This presentation summarizes major ongoing efforts in Senegal either to minimize or eliminate aflatoxin in peanut to meet the requirements of international standards for quality and safety.

The main research achievements include (1) Pre-harvest or agronomic stage where the focus is on development of varieties resistant to *Aspergillus flavus* infection, introduction of effective technical monitoring of drought status with improved irrigation, seed quality, harvest maturity, drying, and sorting, and (2) Post-harvest or processing stage through various initiatives including detoxification of contaminated peanut products using local clays and sunlight, monitoring of the level of aflatoxin in peanuts and peanut products through standardized laboratory techniques, enhancement of laboratory capabilities in both equipment and technical personnel for better monitoring of aflatoxin contamination, especially in exported and imported products, concerted actions by major peanut processors to significantly reduce or eliminate aflatoxins in their products. For instance, all peanut cake production is detoxified at the four units of SONACOS the largest peanut processing company in the country. The company also uses colorimetric sorting machines that are used by all industrial peanut processing companies to discard contaminated kernels thereby enhancing product quality.

This comprehensive approach is intended to enhance the safety of peanut products of Senegal and comply with the stringent regulatory requirements of the international market in order to preserve the country's share of peanut export.

The Electrical Conductivity Test as a Measure of Seed Vigor for Large Seeded Virginia-Type Peanut. J.F. SPEARS*, M.H. SUN and T.G. ISLEIB. Dept. of Crop Science, North Carolina State University, Raleigh, NC, 27695-7620.

Seed vigor tests are used routinely in the corn, cotton, and soybean seed industries to identify seed lots with potential field emergence or storage problems. However, vigor tests for peanut seeds have not been widely explored. Tests were conducted to identify an electrical conductivity (EC) procedure that accurately evaluates seed lot quality and is convenient for seed testing laboratory use. Two seed lots of four commercial virginia-type peanut varieties (NC 7, NC 12C, NC-V 11, and Gregory) were used to evaluate five EC variables including seed moisture (5, 7, 9, and 11%), seed soak time (2, 4, and 24 hr), seed soak temperature (20^{o}C and 25^{o}C), number of seeds (25 and 50) and water volume (100, 125, 150, 175, 200, 250, 300, and 400 ml). When averaged across seed lots, EC values decreased significantly when seed moisture increased from 5 to 7%, remained consistent from 7 to 9% and increased when seed moisture content was increased to11%. EC increased as soak time and soak temperature increased. However, greater separation of seed lot quality was seen when seeds were soaked for 24 hr compared to either 2 or 4 hr. Varying seed number and water volume, either separately or in combination, influenced EC. However, regardless of seed number and water volume combinations, seed lot ranking was consistent. EC reliability and testing convenience was found when 50 seeds were tested at moistures between 7 and 9%, soaked in 250 ml of 25^{o}C water for 24 hr.

ENTOMOLOGY

Comparison of Final TSWV Severity and Yield of Peanuts Treated with Acephate, Aldicarb, or Phorate Insecticide at Planting. J.W. TODD*, Entomology Department, The University of Georgia, Tifton, GA 31793-0748; D.W. GORBET, Agronomy Department, The University of Florida, North Florida Research and Education Center, Marianna, FL 32446-7906; A.K. CULBREATH, Plant Pathology Department, The University of Georgia, Tifton, GA 31793-0748; S.L. BROWN, Entomology Department, The University of Georgia, Tifton, GA 31793-0748; and J.R. WEEKS, Entomology Department, Auburn University, AL 36849.

Field tests were conducted where TSWV final severity (103 tests) and yield (116 tests) were recorded at 10 locations on a total of 29 peanut cultivars over 15 years from 1989 to 2003. Treatment with acephate insecticide (hopper box) at-planting resulted in lower final severity of TSWV than the non-treated check in 66 out of 96 observations and higher final severity of TSWV in 29 out of 96 observations. Treatment with aldicarb 15G insecticide in-furrow at-planting resulted in a higher final severity of TSWV than the non-treated check in 68 out of 132 observations and lower final severity of TSWV in 64 out of 132 observations. Treatment with phorate 20G insecticide in-furrow at-planting resulted in lower final severity of TSWV than the non-treated

check in 381 out of 449 observations and higher final severity than the non-treated check in 61 out of 449 observations. Acephate and phorate resulted in decreases in TSWV 69 and 85% of the time, respectively; while aldicarb resulted in a decrease less than half the time (49%). Treatment effects on yield were possibly affected by other factors in addition to TSWV severity in some tests. Acephate resulted in an increased yield in 67 out of 102 observations (71% of the time). Aldicarb resulted in increased yield in 83 out of 134 observations or 62% of the time. Phorate resulted in increased yield in 373 out of 456 observations or 82% of the time. Control of thrips transmitters of TSWV was good to excellent with all of these insecticides, but there was a clear advantage for phorate in both reduction of TSWV final severity and yield enhancement. These positive effects of treatment with phorate do not appear to be associated with reduction of thrips numbers or damage when compared to non-treated, or acephate, or aldicarb treatment.

Evaluation of Peanut Cultivars for Suitability in Pest Management Systems. J.R. WEEKS*, H.L. CAMPBELL, Dept of Entomology and Plant Pathology, Auburn University, AL 36849; L. WELLS, Alabama Agricultural Experiment Station, Wiregrass Research Extension Center, Headland, AL 36345; and M. PEGUES, Alabama Agricultural Experiment Station, Gulf Coast Research Extension Center, Fairhope, AL 36532.

Nine peanut cultivars were evaluated in 2004 at two locations in southeast and southwest Alabama. Standard insecticide treatments of aldicarb and phorate at 1.0 lb ai/A rate were applied in-furrow at planting on all cultivars. Untreated plots of each cultivar were also maintained for comparison. Studies at both locations were randomized complete block designs with 6 replicates of each treatment. At the Headland location, Ga. Green, Ga-02C, Ga-01R, Tifrunner, DP-1, C-99R, AP-3, and Carver cultivars were evaluated. At the Fairhope location, Ga. Green, Ga-02C, Ga-01R, DP-1, C-99R, AP-3, and ANorden cultivars were evaluated. Thrips damage ratings and plant stand counts were made in both studies at 2-3 weeks after emergence. At approximately 55, 85 and 135 days after planting tomato spotted wilt tospovirus (TSWV) incidence was assessed in each plot by counting the number of row feet of peanut plants that were severely affected by TSWV. Leafspot incidence was estimated just prior to harvest by visually evaluating each plot and assigning a numerical value based upon the Florida 1 to 10 scale. Southern Stem Rot (SSR) incidence was assessed at inversion of the peanut plants and the number of row feet visually affected by SSR was counted. Yield and grade data from each plot were also taken. At both locations and for all cultivars the insecticide treatments of aldicarb and phorate provided a significant reduction in thrips damage to seedling peanuts. Aldicarb-treated peanuts also had less thrips damage than phorate-treated peanuts at both study locations. Final TSWV counts at both locations showed significant differences among the cultivars. At the Headland location, Ga-02C, Tifrunner, AP-3, DP-1, and Ga-01R had the lowest TSWV levels. Ga. Green had significantly greater TSWV than all other cultivars. At Fairhope, AP-3, Tifrunner, Ga-02C, and DP-1 had the

lowest TSWV levels, while Ga. Green had significantly higher levels than all other cultivars. At both locations, when all cultivars were averaged aldicarb and phorate-treated peanuts had significantly less TSWV than did untreated peanuts. At Headland, Ga-01R had the lowest leafspot rating and Ga. Green had the highest. At Fairhope, Ga-01R, Tifrunner, and DP-1 had the lowest leafspot rating, while Ga. Green and ANorden had the highest. Ga-02C and AP-3 had the lowest SSR incidence at Headland while Ga. Green and Tifrunner had the highest incidence of SSR. At Fairhope, Ga-02C and Ga-01R had the lowest SSR incidence and Ga. Green and ANorden had the highest. Yields at Headland ranged from 4800 to 6400 lb/A. Ga-01R had significantly higher yields than all other cultivars with Carver, Tifrunner, AP-3 and DP-1 in a group of slightly lower but significantly different yields than Ga-01R. Ga. Green had the lowest yield of the eight cultivars at Headland. AP-3 and Ga-01R had the highest yields in the Fairhope study. Results indicate for the pests monitored that several of these cultivars offer superior management options for peanut producers.

Survey on Soil Arthropods in Peanut Fields in Southern Ghana. M. OWUSU-AKYAW*, J.V.K. AFUN, J. ADU-MENSAH, F.O. ANNO-NYAKO, J.K. TWUMASI, E. MOSES, K. OSEI, G. BOLFREY-ARKU, S. OSEI-YEBOAH, M.B. MOCHIAH, I. ADAMA, CSIR-Crops Research Institute, P.O. Box 3785, Kumasi, Ghana; R.L. BRANDENBURG, and D. JORDAN, North Carolina State University, Raleigh, NC 27695, USA.

Peanut (*Arachis hypogaea* L.) plays an important role both as a food crop and as a cash crop in Ghana. However, soil arthropod pests are important constraints to production of the crop. A survey was, therefore, conducted in farmers' fields in Ashanti, Brong Ahafo, Eastern and Volta regions of Ghana in 1999 and 2001 to (i) identify soil arthropods of peanut and (ii) to determine damage caused by the pests to pods and seeds of the crop. The local names of the cutivars observed were 'Konkoma', 'Kpedevi' ('Obaatan'), 'Kpanlogo', 'Klukluklui', 'Cameroun', 'Goroga' ('Akukorku'), 'Kowoka', 'China', 'Afromo', 'Broni' and 'Bremawuo'. Six different cultivars were grown in the Volta, four each in the Ashanti and Brong Ahafo and two in the Eastern regions. Only 'Konkoma' was cultivated in all the regions. The soil arthropod pests observed per 15 cm x 15 cm x 15 cm volume of soil in both 1999 and 2001 across the regions were white grubs, millipedes, symphilids, termites, earwigs, wireworms, red ants and mealybugs. The predominant ones were termites. The mean population of the termites was least in the Volta region (2.4-5.9) and high but not significantly different in the other three regions (4.4-10.9). The predatory arthropods were centipedes and black ants, the mean number of the black ants (1.6-5.8) being significantly greater than that of the centipedes (0.2-1.0) in all the locations. In either 1999 or 2001, the mean percent damage caused by the arthropods to the pods (1.4-3.9) or seeds (0.0-6.7) per hill of the cultivars across the regions was very low and not significantly different.

POSTER SESSION I

Peanut Soil Insect Pest Studies and Evaluation of Chlorpyrifos Management Options. D.A. HERBERT, JR.*, and S. MALONE, Department of Entomology, Virginia Tech, Tidewater Agricultural Research and Extension Center, Suffolk, VA 23437.

In 2003, seven commercial peanut fields were randomly selected for sampling of soil insects. In each, plants were dug weekly from July 21 when peanut plants reached the R3 stage (first appearance of pods) though September 15 when plants reached the R7 stage (beginning maturity). Plants were dug with the associated soil around the pod and root zone (about 2-3 gallons of soil per plant), placed into 5-gallon buckets and returned to a stationary soil screening device. Each was washed through a series of two screens, the first made of hardware cloth with quarter-inch mesh, and the second made of commercial window screen. All pods were inspected for presence of injury by soil organisms, and all insects were counted and preserved for later identification. A total of 444 plants were sampled during the season. Results showed that the predominant insect soil pest was southern corn rootworm (*Diabrotica undecimpunctata howardi*) with a total of 238 larvae captured, followed by 30 annual white grubs (unknown sp.), 25 digging beetles (unknown sp.) and 11 wireworms (unknown sp.). There were two peaks in the rootworm larval numbers, one very small on about August 8 and a much larger one on September 8. Efficacy of chlorpyrifos 15G (Lorsban 15G, Dow AgroSciences, Indianapolis, IN, USA) at 2 lb ai/acre applied at pegging time was compared with chlorpyrifos 4E (Lorsban 4E, Dow AgroSciences, Indianapolis, IN, USA) at 2 lb ai/acre applied pre-planting soil incorporated (PPI). Plots were 200 ft long x 4 rows wide (rows on a 36-inch center) and arranged in randomized complete block experimental design with four replicates. Pod damage was determined by inspecting 200 pods randomly selected from the center 2 rows of each plot after peanuts were inverted, just prior to harvest. Both treatments resulted in fewer damaged pods and numerically higher yields (pounds per acre) compared with the untreated control (Lorsban 15G – 3407a; Lorsban 4E – 3470a; untreated – 3189a; LSD=976; P=0.80). In 2004, five producers applied Lorsban 15G (2 lb ai/acre) at pegging, Lorsban 4E (2 lb ai/acre) PPI and an untreated control in replicated strips. Individual strip width and length varied with the producer, according to their insecticide application equipment and field size. Plants and associated soil were sampled from each treatment from July 9 through August 19 using techniques described above. A total of 459 plants were sampled from all treatments, fields and dates. A total of only 15 southern corn rootworm larvae, four annual white grubs and six wireworm larvae were collected from the entire 459 plant sample – too few for any meaningful treatment comparison. In a small plot test using the same techniques described for 2003, both chlorpyrifos treatments resulted in fewer damaged pods and significantly higher yields (pounds per acre) compared with the untreated control (Lorsban 15G – 3997a; Lorsban 4E – 4091a; untreated – 3512b; LSD = 396; P=0.02).

Improved Management of Tomato Spotted Wilt Virus in the North Carolina and Virginia Peanut Areas: Evaluation of the Thrips Vectors, Their Seasonal Abundance, and Sensitivity to Insecticides. B.M. ROYALS*, R.L. BRANDENBURG, Department of Entomology, North Carolina State University, Box 7613, Raleigh, NC 27695-7613, D.A. HERBERT, JR., Tidewater AG RES & EXT Center, 6321 Holland Road, Suffolk VA 23437, D.L. JORDAN, Department of Crop Science, North Carolina State University, Box 7620, Raleigh, NC 27695-7620.

North Carolina peanut growers have seen an increase in the amount of tomato spotted wilt virus (TSWV) over the past five years. TSWV is transmitted by thrips as they feed on the peanuts. Both in furrow and foliar insecticides are quite efficacious in controlling thrips, but often have only a limited impact on the incidence of the disease since the virus may be transmitted to peanut before the thrips die. There are no known controls measures for TSWV, but several cultural practices are available to help reduce the incidence of the virus. Research in NC and VA has looked at using multiple applications of foliar insecticides as an additional approach to reduce the amount of TSWV. Field studies were conducted in 2003 and 2004 in Bertie County, NC and Suffolk, VA. Plots were 2 rows wide (1.8 m) and 40 feet long (12.2 m). VA98R peanuts were planted in Bertie County, NC on 9 May in 2003 and 10 May in 2004. VA98R peanuts were also planted in Suffolk, VA on 7 May in both 2003 and 2004. Plots were established using Temik 15G at 1.0 lb ai/A in-furrow and Thimet 20G at 0.4 lb ai/A in-furrow. Plots were treated with acephate 97S at 0.36 lb ai/A at 2, 4, and 6 weeks after planting. Thrips damage ratings were taken prior to each foliar application. Results indicate no significant difference between the at-plant, in-furrow treatments versus plots treated with multiple applications of acephate in reducing the number of thrips. TSWV ratings were also taken during the growing season and at harvest and these results indicate no significant reduction in the amount of TSWV with multiple acephate foliar sprays. There was no yield difference between the standard in-furrow treatments and those treated with multiple foliar sprays. Management of TSWV remains focused on options such as variety selection, planting date, plant population, insecticide selection, and tillage practices rather than multiple insecticide applications. All of these production practices play a vital role in minimizing the amount TSWV in peanuts and multiple insecticide applications increase cost of production with no documented benefits.

Using Nutrient Solutions to Trap the Almond Moth (Lepidoptera: Pyralidae) in a Peanut Shelling and Storage Facility. X. NI, and C.C. HOLBROOK*, USDA-ARS, Crop Genetics and Breeding Research Unit, Tifton, GA 31793.

The almond moth, *Ephestia* (*Cadra*) *cautella* (Walker) (Lepidoptera: Pyralidae) is an important insect pest in agricultural product processing and storage facilities worldwide. The objective of this study was to evaluate various trapping strategies to control the almond moth in a peanut (*Arachis hypogaea* L.) shelling and storage facility. The efficacy of water-based nutrient solutions as attractants was compared with

commercially-available synthetic pheromone traps. The experiment was repeated four times. Eight treatments used in the experiment were: water, 10% honey, 10% beer, and 10% sucrose solutions, pheromone trap in water bucket, pheromone trap in the bucket without water, empty bucket, and hanging pheromone trap alone. The honey solution and pheromone trap in water bucket trapped the most number of moths among the eight treatments. The pheromone trap in a water bucket trapped significantly more moths than by the hanging pheromone trap alone. In addition, although the total number of moths caught by the honey solution and the pheromone trap in a water bucket was the same, a significantly higher number of females were caught by the honey solution than the pheromone trap in a water bucket. The experiment demonstrated that *E. cautella* adults preferred honey to water as attractants. Because the 10% honey solution alone trapped the same number of moths as the water buckets did, and 70% of the honey-trapped moths were females, we suggested that the diluted honey solutions could be used to design effective and economic traps for *E. cautella* control in storage facilities. The combination of pheromone traps with water-based nutrient solutions (e.g., diluted honey solution) would be a significant improvement for *E. cautella* population reduction and ultimately eradication in the stored product facilities.

A New Chart Designed to Assist Peanut Growers to Make Decisions About Digging Peanut in the Virginia-Carolina Region of the United States. D. JOHNSON, D. JORDAN*, J. SPEARS, B. PENNY, B. SHEW, R. BRANDENBURG, T. ISLEIB, North Carolina State University, Raleigh, NC 27695; J. FAIRCLOTH, P. PHIPPS, A. HERBERT, D. COKER, Virginia Tech, Suffolk, VA 23437; and J. CHAPIN, Clemson University, Blackville, SC 29817.

Pod mesocarp color is used to help growers predict optimum pod maturity in order to enable them to dig when maximum yield potential and optimum market grades can be realized. Cooperative Extension agents in the Virginia-Carolina (V-C) region have been using charts developed for runner market types grown in the southeastern United States to assist growers digging Virginia market types in the V-C region. Recently, equipment needed to evaluate pod maturity has improved and will allow growers to employ this technique without using the traditional “pod blaster”. It is possible that many growers will forgo attending pod maturity clinics offered by the Cooperative Extension Service and evaluate pod maturity on the farm. For this reason a new chart was developed to provide growers with additional information that needs to be considered in the process of deciding when to dig peanut. The new chart includes traditional color categories with approximate days required to reach the black mesocarp color and three distinct curves that allow growers to group pods and perhaps more easily visualize the relationship of a maturity profile with days to optimum maturity. Color photographs of pod color categories and examples of actual field samples are provided. Information relative to the benefits of digging at optimum maturity, estimates of the percentage of disease needed to justify digging early, and comments addressing freeze damage are included on the chart.

Factors Influencing Peanut Production in Bulgaria: Economic and Financial Analysis. N. BENCHEVA*, Agricultural University in Podiv, Bulgaria, C.M. LIGEON, Auburn University at Montgomery, S. DELIKOSTADINOV, Institute of Plant Genetic Resources in Sadavo, Bulgaria, C.M. JOLLY, Auburn University, Auburn, Alabama, and N. PUPPALA, New Mexico State University.

During the 2000/2002 period the main factors influencing peanut production in Bulgaria in the transition period were investigated. The following factors: Socioeconomic characteristics of producers; size and utilization of land by crops in rotation; yield; level of mechanization; use of main resources, such as fertilizers, chemicals, irrigation; production costs; and marketing and distribution of peanuts influence peanut production in Bulgaria. The current investigation considers only these factors: land use, fertilizers, chemicals, irrigation yields, and use of mechanization. The results obtained lead to the conclusion that the average size of the studied peanut farms is 8.1 ha. The share of peanuts in total cultivated area is 9%. The average size per farm is 0.8 ha. Peanuts account for 15% of the area cropped. The crops that are cultivated prior to growing peanuts are wheat-52%, barley-9%, and vegetables-4%. About 91% of farmers apply nitrogen fertilizer and 17% phosphates. Almost 99% of the studied growers produce peanuts on irrigated land. Fifty percent of the growers irrigate peanuts twice during the growing season. The most common type of irrigation is flood irrigation, and 69% of growers use water from the state firms. About 81% of the producers rent machines for the farming operations. The mechanization level in peanut production is inadequate because of the lack of owned machines and equipment. The yields range from 1,282 to 2,784 kg/ha, and do not correspond to the genetic potential of the varieties developed. Land fragmentation, lack of mechanization, and investment capital constrain the organization and development of the peanut industry at this stage.

Adjusting the Peanut Variety and Quality Evaluation Program to Reflect Acreage Shifts and Assess the Potential of Runner-types Grown in the Virginia-Carolina Region. D.L. COKER*, H.G. PITTMAN, and J.C. FAIRCLOTH, Department of Crop Soil and Environmental Sciences, Virginia Tech, Suffolk, VA, 23437

Producers in the Virginia-Carolina (V-C) region face the challenge of adapting to a dramatically altered peanut program and a slow-growing market for virginia-type peanuts. At the present time, growers, shellers, and manufacturers have an interest to increase marketing opportunities for peanuts in the V-C region using runner-types. Since 2002, the acres planted to peanut in Virginia decreased by 57 percent and by 16 percent in North Carolina. Recent marketing changes have also led to a considerable shift southward of peanut acres in North Carolina. Information was lacking on the disease susceptibility, performance, and quality of varieties and advanced breeding lines grown in these “new” production areas. Beginning in 2004, Peanut Variety and Quality

Evaluation (PVQE) small-plot tests were established at North Carolina State University's Border Belt Tobacco Research Station (Columbus County) which represents a part of the new growing environment. The small plot tests in Columbus County will be continued in 2005 and an additional test site will be established on a cooperator farm in Sampson County, North Carolina. Runner-type varieties that appeared to reach maturity and yield well in a preliminary test at the Tidewater Agricultural Research and Extension Center in 2004 will be included in all PVQE small plot tests in 2005. Continued testing of virginia- and runner-type varieties in representative growing areas should give producers additional marketing options, attract new growers, and contribute toward the viability of the peanut industry in the V-C region.

Evaluation of Cultivated and Wild Peanuts for Tomato Spotted Wilt Virus Resistance. R.N. PITTMAN*, USDA-ARS, Plant Genetic Resources Conservation Unit, Griffin, GA 30223, J.W. TODD, A.K. CULBREATH, University of Georgia, CPES, Tifton, GA 31793 and D.W. GORBET, UFL, NFR&EC, Marianna, FL 32446.

Peanut plants infected with thrips vectored TSWV can result in losses up to 100% depending on when plants are infected. Resistance to the virus would be a valuable addition to a disease management program since insecticides are not effective in controlling the infection in the field and by the absence of dependable sources of resistance. A total of 474 *Arachis* accessions were evaluated for resistance to TSWV under field conditions. Germplasm accessions were sown in the field during the spring season and field inoculated. Different levels of resistance to the disease were observed among the tested lines. Accessions were visually evaluated for virus throughout the growing season and verified with ELISA for plots with low levels of virus infection. Ranked transformed means were used each year for comparisons. One accession of *A. hypogaea,* PI 261982 had the lowest mean followed by PI's 497255, 476052, and 475952. Fourteen wild accessions of *Arachis* had very good levels of resistance. Resistant germplasm could be identified using one year of data.

Genetic Variation in Molecular and Cellular Expression of Peanut Genotypes to Water Stress. R. KATAM*, S.M. BASHA, and H.K.N. VASANTHAIAH, Division of Agricultural Sciences, Florida A&M University, Tallahassee, FL 32317.

Peanut is an important food legume in the arid regions of the tropics. We have initiated a quantitative analysis of metabolite and transcript changes following water stress. A study was conducted to determine the impact of water-deficit on peanut genotypes with varying degree of drought tolerance. Following exposure to various durations of water stress, leaf and seed samples were collected from stressed plants, and analyzed for protein and transcript profiling. Changes in seed protein expression were monitored by electrophoresis. The results showed significant changes in protein expression among the peanut genotypes in response to water stress. Prolonged duration (14 days) of water stress appeared to induce new proteins. Total RNA was isolated from

leaf and seed tissue of plants exposed to four different stress periods (1, 2, 3 and 4 weeks) to determine gene expression level. Transcript profiling will be conducted in parallel with the protein expression profile to determine the interrelationship between expressed transcripts and proteins, and to identify transcripts associated with drought resistant characteristics. We will use Differential Display RT-PCR to isolate cDNAs corresponding to the transcripts responding to water stress. Such global transcript profiling supplemented with protein data will be used to elucidate specific metabolic pathways that are perturbed by water-deficit treatments. Supported by USAID/PCRSP, FAM #51.

Identification and Characterization of Drought Induced Transcripts in Peanut. K.M. DEVAIAH*, GEETHABALI, Biotechnology Department, Bangalore University, Bangalore 560056, India; K.S.S. NAIK, ANGR Agricultural University, India; S.M. BASHA, Florida A&M University, Tallahassee, FL, 32307.

Drought stress is reported to alter gene expression. Some of the stress induced transcripts may be specific for either drought tolerance or drought susceptibility. To identify the drought-induced transcripts, peanut genotypes with varying drought tolerance characteristics were subjected to water stress. Peanut (cv. Vemana, K-1375) plants were grown in pot culture for 30 days and subjected to water stress for 5 to15 days by withholding irrigation. Total RNA was isolated from leaves and Differential Display RT- PCR (DDRT-PCR) was performed using cDNA made from the total RNA. Two primer combinations (P1 and T3) were used for PCR. The PCR reaction consisted of 10ng of cDNA, 0.2µl dNTP (5mM), 1µl of each primer (1.5nm), 1µCi of αP^{32}dATP and 3units of Taq DNA polymerase. The PCR product was denatured and run on a 6% urea sequencing gel. The gel was dried and exposed to X-ray film for 16-24 hrs. Sequencing gel showed presence of two differentially expressed products. These bands were eluted from the gel and re-amplified with the same primers used for DDRT-PCR. The PCR product was run on a 1.5% agarose gel and the two bands were found to correspond to approximately 150bp and 250bp. The PCR product was purified using the minielute kit (Qiagen) and then cloned to a TA cloning vector (Qiagen). The recombinant vector was transformed into DH 5 α and then plated onto X-Gal/IPTG/Amp plate. White colonies were sub-cultured and sequenced. The sequence was compared with NCBI database using the BlastX program. The results showed no similarity with the known sequences available in the NCBI database. The amino acid sequence derived based on the nucleotide sequence indicated that it is rich in leucine. Studies are in progress to determine differential expression of this transcript between drought-susceptible and drought-tolerant peanut genotypes at different water stress levels. Supported by USAID/PCRSP, FAM #51.

Utilization of the NMSU Peanut Varieties as a Germplasm in Bulgarian Valencia Peanut Breeding Program. S.G. DELIKOSTADINOV*, Institute of Plant Genetic Resources – 4122 Sadovo, Bulgaria, N. PUPPALA, Department of Agronomy and Horticulture, New Mexico State University, Las Cruces, NM 88101.

During the period 1968 to 2002 Bulgaria has developed new Valencia peanut varieties namely Sadovo-2609, Kalina, Rossitsa, Orpheus and Kremena. All these new varieties are under cultivation by peanut growers. More than 450 breeding lines with different positive traits are under investigation at the IPGR Institute. These varieties present a new model of Valencia peanut, with erect habit, tender stems with short plant height (40-45 cm), 5-7 lateral branches close to the central stem with shorter internodes, large size pods, compact plant type, larger seed size with typical Valencia type flavor. The maturity of these lines ranges from 125 to 130 days with intensive flowering that resulted in a greater number of mature pods at harvest. Most of the experimental lines have shorter period of pod formation with a high genetic potential of 5-6 t/ha. Some of these experimental lines are resistant to fungal diseases and are suitable for mechanized harvesting. The collaboration between NMSU and IPGR through Peanut CRSP program has enriched the Bulgarian peanut breeding program resulting in 1553 new hybrid progenies in F1 and 179 progenies in F2. These progenies were developed by crossing New Mexico Valencia peanuts with Bulgarian peanut germplasm. This paper will emphasize the performance of the F1 and F2 crosses on pod yield, disease resistance and days to maturity.

Identification of Differentially Expressed Genes in Peanut in Response to *Aspergillus parasiticus* infection and Drought Stress. M. LUO, D. LEE, University of Georgia, Department of Crop and Soil Sciences, Tifton, GA 31793; X.Q. LIANG, Guangdong Academy of Agricultural Science, Crop Science Institute, Guangzhou, China; B.Z. GUO*, USDA-ARS, Crop Genetics and Breeding Research Unit, Tifton, GA 31793.

Aflatoxin contamination caused by *Aspergillus* fungi is a great concern in peanut production worldwide. Pre-harvest *A. parasiticus* infection and aflatoxin contamination are usually severe in peanuts that are grown under drought stressed conditions; however, drought tolerant peanut lines have less aflatoxin contamination. The objective of this study was to identify resistance genes in response to *A. parasiticus* infection under drought stress using miccroarray and real-time PCR. To identify transcripts involved in the resistance, we studied the gene expression profiles in peanut genotype A13 which is drought tolerant and resistant to preharvest aflatoxin contamination, using cDNA microarray containing 384 unigenes selected from two EST (expressed sequenced tag) cDNA libraries challenged by abiotic and biotic stresses. A total of 83 up-regulated spots (Log2 ratio>1) representing 42 genes in several functional categories were detected under both *A. parasiticus* infection and drought stress. A total of 104 up-regulated spots representing 52 genes were detected in response to drought stress alone. There were forty-nine up-regulated spots (25 genes) commonly expressed in both treatments. The top 20 genes were selected for validation of their expression levels using real-time PCR. A13 was also used to study the functional analysis of these genes and a possible link of these genes to the resistance trait. Microarray technology and real-time PCR were used for comparison of gene expression. The selected genes identified by

microarray analysis were validated by real-time PCR. Further investigations are needed to characterize each of these genes. Gene probes could then be developed for application in breeding selection.

Biochemical Responses of Peanut to Drought Stress and Their Role in Aflatoxin Contamination. M.S. ALAM*, B.L. CHOWDHURY, Bangladesh Agricultural University, Mymensingh, Bangladesh and S.M. BASHA, Florida A& M University, Tallahassee, Florida, USA.

Pre-harvest invasion of Aspergillus occurs primarily under drought stress and is associated with elevated soil temperature and reduced moisture level. Under drought stress, susceptibility of peanuts to fungal invasion increases due to reduced metabolic activity and decline in pod water content. One of the strategies in developing aflatoxin tolerant peanut genotype is to identify biochemical/molecular markers linked to drought/aflatoxin tolerance. Drought stress alters plant genetic expression, which may be specific for either drought tolerance or susceptibility. Hence, the drought tolerant and drought susceptible genotypes respond differently to drought stress. In Bangladesh, peanuts are primarily grown in dry river belts, and drought stress seems to adversely affect peanut yield and quality. The objective of this study was to determine performance of drought-tolerant and drought-susceptible genotypes in Bangladesh under drought stress. Fifty six peanut genotypes with varying levels of drought tolerance were procured from ICRISAT and grown at the Bangladesh Agricultural University along with four local cultivars in the year 2003-2004. Peanut plants were subjected to water stress using rainout shelter. Leaf and seed samples were collected from the irrigated and drought stressed plants and subjected to biochemical analysis. The results showed that drought stress increased soluble sugars (0 to 126% over control) and free proline (0 to 28-fold) levels in the peanut leaves. Proximate analysis showed wide variation in the Ca (0.06 to 0.104%), P (0.42 to 0.57%), protein (21 to 28%), and fat (38 to 50%) levels among the genotypes. In addition, fatty acid and methionine (2 to 5.2%) composition of peanuts also varied widely among the genotypes. Oil of peanut was found to contain 84 to 90% unsaturated fatty acid (oleic and linoleic) and 8 to 16% saturated fatty acid (palmatic and stearic) with a O/L ratio of 82 to 2.75. Mean performance of yield and yield contributing characters also varied among the genotypes. Data on 13 different characters were recorded and 8 most important yield and yield contributing characters were analyzed. Significant differences among the genotypes were found for all the characters. The overall results showed that certain genotypes viz. ICGV-95386, ICGV-94173, ICGV-87846, ICGV-97182, ICGV-97232, ICGV-96318, ICGV- 86707 and ICGV-93277 produced excellent yield with maximum number of branches, pods, kernels per pod as well as highest mature pods and shelling percentage. Out of the 8 best performing genotypes only ICGV-93277 was identified as drought tolerant based on biochemical tests. Among the other drought tolerant genotypes, 3203 showed better performance followed by ICGV-93269 and ICGV-88388. Studies are in progress using some more genotypes to see the role identified drought tolerant genotypes on Aflatoxin contamination. Supported by Peanut CRSP/USAID.

Identification of AFLP Markers Linked to Reduced Aflatoxin Accumulation in *A. cardenasii*-derived Germplasm Lines of Peanut. S.R. MILLA*, T.G. ISLEIB, S.P. TALLURY, Dept. of Crop Science, Box 7629, N.C. State Univ., Raleigh, NC 27695.

Contamination of peanuts with aflatoxin produced by soil fungi *Aspergillus flavus* and *A. parasiticus* is a serious worldwide problem resulting from pre-harvest infection or contamination during storage under improper conditions. Elimination of aflatoxin contamination is a high priority of the peanut industry because of human health concerns. Besides adopting certain cultural, harvest, and storage practices, resistant cultivars should be an effective and low-cost part of an integrated aflatoxin management program. However, aflatoxin contamination is expensive to measure and exhibits high environmental variation. Marker assisted selection can improve the efficiency and cost effectiveness of selection for traits of this sort. Genetic variation for post-harvest resistance to aflatoxin accumulation had been previously found in a set of germplasm lines derived from an interspecific hybrid between *A. cardenasii* and *A. hypogaea.* One of the lines that produced the least aflatoxin in previous experiments was GP-NC WS 2, a leafspot-resistant selection from the *A. hypogaea* x *A. cardenasii* cross. The objective of the present study was to identify molecular markers linked to genetic factors controlling reduced aflatoxin accumulation that could ultimately be used to improve the efficiency of selection when transferring the low aflatoxin production characteristic of GP-NC WS 2 into elite peanut breeding materials. *A. cardenasii* derived lines were initially screened using 256 primer combinations for amplified fragment length polymorphism (AFLP) markers. Statistical methods were subsequently used to identify candidate markers associated with low aflatoxin production.

B-1,3-Glucanase Activity in Peanut Seed and is Induced by Infection of *Aspergillus flavus*. X.Q. LIANG, Guangdong Academy of Agricultural Sciences, Institute of Crop Sciences, Guangzhou, China; B.Z. GUO*, USDA-ARS, Crop Protection and Management Research Unit, Tifton, GA 31793, and C.C. HOLBROOK, USDA-ARS, Crop Genetics and Breeding Research Unit, Tifton, GA 31793.

Infection of peanut (*Arachis hypogaea* L.) seeds by *Aspergillus flavus* and *A. parasiticus* is a serious problem that can result in aflatoxin contamination in the seeds. Breeding resistant cultivars would be an effective approach to reduce aflatoxin accumulation. The objective of this study was to investigate the expression of pathogenesis-related (PR) protein *β*-1,3-glucanase and the isoform patterns in peanut seeds inoculated with *A. flavus*. Peanut genotypes, GT-YY9 and GT-YY20 (both resistant to *Aspergillus flavus* infection), and Georgia Green and A100 (both susceptible to *A. flavus* infection), were used in this study. The activities of *β*-1,3-glucanase were similar in the un-infected seeds of all genotypes, but increased significantly in the resistant genotypes after inoculation in comparison with the susceptible genotypes. An in-

gel (native PAGE) enzymatic activity assay of β-1,3-glucanase revealed that there were more protein bands corresponding to β-1,3-glucanase isoforms in the infected seeds of resistant genotypes than in the infected seeds of susceptible genotypes. Both acidic and basic β-1,3-glucanase isoforms were detected in the IEF gels. Thin layer chromatography (TLC) analysis of the hydrolytic products from the reaction mixtures of the substrate with the total protein extract or individual band of native PAGE revealed the presence of enzymatic hydrolytic oligomer products. The individual bands corresponding to the bands of β-1,3-glucanase isoforms Glu 1-5 were separated on the SDS-PAGE resulting in two bands, 10-kDa and 13-kDa, respectively. The sequences of fragments of the 13-kDa major protein band showed a high degree of homology to conglutin, a storage protein in peanut seeds. Conglutin is reported as a peanut allergen, *Ara* h2. Our data provide the first evidences for peanut having β-1,3-glucanase activities and the association with the resistance to *A. flavus* colonization in peanut seeds. We have not directly demonstrated that conglutin has β-1,3-glucanase activity.

POSTER SESSION II

Impact of Calendar and Advisory Programs on the Control of Late Leaf Spot, Rust, and Southern Stem Rot of Peanut in a Dry-land Production System in Southwest Alabama. H.L. CAMPBELL*, A.K. HAGAN, and K.L. BOWEN, Dept. of Entomology and Plant Pathology, Auburn University, Auburn, AL 36849; and M.D. PEGUES, Gulf Coast Research and Extension Center, Fairhope, AL 36532.

The leaf spot advisory AU-Pnut was developed at Auburn University to improve the timing of scheduled fungicide sprays for the control of foliar diseases of peanut. When used by farmers, this expert system can save from one to three sprays per season. In 2003 and 2004, tests were conducted at the Gulf Coast Research and Extension Center in Fairhope, AL to compare the calendar and AU-Pnut advisory programs on the control of leaf spot diseases and soil-borne diseases in southwest Alabama. The test consisted of Bravo Ultrex, Bravo Ultrex/Folicur 3.6F, and Bravo Ultrex/Abound 2.08SC programs. Full canopy sprays were made on a 14-, 21-, and 28-day calendar schedule, as well as according to the AU-Pnut leaf spot advisory. The peanut DP-1 and Florida C-99R was used in 2003 and 2004, respectively. Tests were not irrigated. Leaf spot ratings were made using the Florida 1-10 leaf spot scoring system beginning July 30 in 2003 and July 14 in 2004. Ratings were made at two-week intervals and area under the disease progress curve (AUDPC) was calculated from the ratings. Rust was rated using the ICRISAT 1-9 rust rating scale. Southern stem rot (SSR) hits were made at inversion as the number of disease loci per total row foot. Yields were calculated based on an area 6 x 30 feet. AUDPC results from 2003 showed that the Bravo/Folicur program applied on the AU-Pnut schedule gave the best leaf spot control. The best rust control was observed in the treatments with the 14-day calendar and AU-Pnut

Bravo/Abound programs. SSR incidence was low and very little differences in control were observed between the spray programs. Results showed that the highest yields were obtained in the Bravo/Abound treatment program applied under the AU-Pnut schedule and the lowest were the Bravo Ultrex regime applied every 28 days. In 2004, the AUDPC for the AU-Pnut Bravo Ultrex program gave the best leaf spot control, however this was not significant from Bravo applied at 14-days or Bravo/Abound applied at 14-or 21-days and under the AU-Pnut schedule. The worst control was observed in all plots treated with Folicur 3.6F. The best rust control was obtained with the 14-day calendar Bravo Ultrex program. However, as treatment intervals lengthened, the severity of rust also increased. As was seen with leaf spot, the worst control of rust was observed in the treatment regimes that included applications of Folicur 3.6F. SSR was minimal in plots with very little differences observed. Yield among all plots were similar, however the 28-day calendar and AU-Pnut Bravo/Folicur programs had the lowest yields. Highest yield was obtained in the Bravo/Abound treatment regimes applied at 14-days and according to the AU-Pnut advisory.

Preliminary Evaluation of Diseased and Non-Diseased Peanut Leaves Using Hyper Spectral Imaging. C. DHARMASRI, Syngenta Crop Protection, Greensboro, NC 27419; D. CARLEY*, D. JORDAN, and M. BURTON, Department of Crop Science, North Carolina State University, Raleigh, NC 27695; T. SUTTON, Department of Plant Pathology, North Carolina State University, Raleigh, NC 27695-7616; and R. BRANDENBURG, Department of Entomology, North Carolina State University, Raleigh, NC 27695-7613.

Research was conducted in North Carolina during 2004 to compare hyperspectral images of peanut leaflets with visible early leaf spot and web blotch lesions. Reflectance was measured in late September using an ASD FieldSpec Pro FR portable spectroradiometer. Reflectance for each wavelength 350 to 2,500 nm was grouped into 50 nm sections for analysis. Hyperspectral imaging indicated that differences in leaves with visible lesions could be differentiated from non-diseased leaflets for bandwidths between 700 and 1849 nm. With the exception of bandwidths of 700-749 nm and 750-799 nm, there was no difference in reflectance when comparing leaflets with one early leaf spot lesion, leaflets with more than one early leaf spot lesion, and leaflets with one web blotch lesion. At these bandwidths reflectance was lower when comparing leaflets with one web blotch lesion to leaflets with one or more early leaf spot lesions. Whole plant hyperspectral imaging of plants exhibiting visual symptoms of tomato spotted wilt revealed differences across most of the 50 nm bandwidths compared with non-diseased plants. One important aspect of this research is to determine if hyperspectral imaging can be used to initiate fungicide sprays prior to lesion development. Research is in progress to address this aspect.

Interference and Seedrain Dynamics of Jimsonweed (*Datura stramonium.* L) in Peanut (*Arachis hypogaea* L.). I.C. BURKE*, M.S. SCHROEDER, S.B. CLEWIS, W.J. EVERMAN, W.L. BARKER, W.E. THOMAS, and J.W. WILCUT. North Carolina State University, Raleigh, NC.

Studies were conducted to determine the effect of interference between jimsonweed (*Datura stramonium* L.) and peanut (*Arachis hypogaea* L.) on plant growth and productivity. Research was conducted at the Cherry Research Farm near Goldsboro, NC and the Upper Coastal Plain Research Station near Rocky Mount, NC. Jimsonweed seed rain was also evaluated. Treatments were varied infestations of jimsonweed ranging from 0, 1, 2, 4, 8, 16, and 32 weeds per row. Weeds were planted in the center two rows of each four row plot. The outside rows were treated as guard rows and not included in yield analysis. Plots were kept weed-free by hand. Typically weed height was not affected by density, however as weed density increased peanut height and overall above ground biomass decreased. An inverse relationship was noted for peanut yield as jimsonweed density increased. Increased jimsonweed density also caused a decrease in number of seed capsules per plant.

Palmer amaranth (*Amaranthus palmeri*) Interference in Peanut (*Arachis hypogaea* L.). W.E. THOMAS*, M. SCHROEDER, I.C. BURKE, S.B. CLEWIS, W.J. EVERMAN, W.L. BARKER, and J.W. WILCUT. North Carolina State University, Raleigh, NC.

Palmer amaranth possesses many growth characteristics that make it one of the more competitive summer annual broadleaf weeds in peanut. It is capable of very high growth rates, prodigious seed production, and an extended period of germination. Palmer amaranth has been the subject of considerable research. It was ranked highest of four pigweed spp. (including common waterhemp, redroot pigweed, and tumble pigweed) based on various growth parameters including dry weight, leaf area, and height (Horak et al 2000). Palmer amaranth reportedly produced up to 600,000 seeds per plant (Keeley et al. 1987). Currently marketed postemergence herbicides allow growers to utilize economic thresholds for Palmer amaranth management in peanut. Weed seed production has been cited as a concern of growers and other agricultural personnel. No studies have evaluated interference relationships or seed rain dynamics of Palmer amaranth and peanut. The objectives were to evaluate interference effects of Palmer amaranth at various densities in peanut and calculate economic thresholds for managing Palmer amaranth in peanut and determine seed production of Palmer amaranth at various densities in peanut.

Palmer amaranth density did not influence peanut height or Palmer amaranth height, but it did influence peanut diameter based on multivariate ANOVA on estimated parameters of the Gompertz growth equation. The Palmer amaranth were taller than peanut for the majority of the season and were much taller (1.3 to 1.8 m for Palmer amaranth versus 0.2 m for peanut) during the last 5 to 7 weeks of the season. Maximum height was 175 cm for Palmer amaranth. Density-dependent

effects on dry biomass plant^{-1} were not significant (P>0.05) when Palmer amaranth was grown with peanut. Average dry biomass of Palmer amaranth when grown with peanut at various densities was 281 and 350 g plant-1 for Goldsboro and Rocky Mount, respectively. Weed dry biomass m-1 was linearly related to peanut yield. Yield reductions do not account for harvesting efficiency since weeds were removed prior to peanut harvest. The large amount of plant material on mature plants and corresponding root biomass would likely reduce peanut harvest efficiency. These data indicate that the Palmer amaranth is more competitive than common cocklebur (I=20.6) (4), fall panicum (I=20.8) (5), and less competitive than common ragweed (I=68.3) (1). Palmer amaranth in this study formed a complete canopy at the higher densities and likely competed more effectively than all the aforementioned weeds but common ragweed for light. At the highest density of 5.2 plants m-1 crop row 1.2 billion seed ha^{-1} was produced by Palmer amaranth. Based on the economic threshold for imazethapyr application, seed production would be 44 million seed ha^{-1} from Palmer amaranth. At only 1% germination during the next season, Palmer amaranth seedlings would exist at 44 plants m^{-2}. Palmer amaranth is as competitive in peanut as many other weeds and economic thresholds were as high as 1 plant 14 m^{-1} of crop row. Palmer amaranth has astoundingly high fecundity (> 1.2 billion seed ha-1 at economic threshold). Thus, seed production can easily replenish original levels at sub-economic-threshold plant populations.

Clearfield Corn Interference in Peanut (*Arachis hypogaea* L.). W.J. EVERMAN*, S.B. CLEWIS, I.C. BURKE, W.L. BARKER, and J.W. WILCUT. NC State University, Raleigh, NC.

Imidazolinone herbicides are commonly applied pre and postemergence in peanut. With the introduction of Clearfield corn the potential for volunteer corn to become problematic in peanut is increased. No studies have evaluated interference relationships of imidazolinone resistant corn in peanut. Therefore, objectives of this study were to determine yield and growth reductions caused by Clearfield corn interference in peanut and to determine an economic threshold for herbicide application to control Clearfield corn in peanut. Thus, studies were conducted to evaluate the competitiveness of Clearfield corn when plants are grown at several densities in peanut. Separate studies (RCBD, 3 replications) were conducted at the Upper Coastal Plain Research Station near Rocky Mount and the Peanut Belt Research Station near Lewiston-Woodville, NC in 2004. Clearfield corn seed was planted in the middle two of four peanut rows at 0, 0.05, 0.1, 0.2, 0.4, 0.8, and 1.6 plants ft^{-1} crop row. Undesirable weeds were removed throughout the season with herbicide applications when necessary and weekly hand weeding. Height and diameter of four peanut and height of 4 corn plants per plot were collected at 3, 4, 5, 8, and 13 weeks after planting. Just before peanut harvest, 4 corn plants were harvested by hand for biomass as well as seed set and weight. The remaining corn plants were removed to aid inversion of peanut for harvest. Peanut plots were then harvested and yield determined. Bi-weekly height and diameter data were fit to the Gompertz growth equation and estimated

parameters and year effects were evaluated in SAS statistical software. ANOVA was conducted with sums of squares partitioned to test for linear and nonlinear effects of corn density and location effects. Regression analysis (linear or nonlinear depending on ANOVA) was used for the seven densities in peanut and trends with significant correlation coefficients were interpreted.

Corn did not influence trends in peanut height at any density; however, peanut diameter was reduced as corn density increased. Peanut plants caused a height reduction in corn plants at a density lower than 0.4 plants per ft crop row. The relationship between corn density and peanut yield was fit to the hyperbolic function (Y=IX/(1+(IX/100)), with asymptote constrained to 100%, which explained the relationship between corn density and percent yield loss. The competitiveness of corn was indicated by the estimated value of *I*, which was 38.6. As a comparison, the *I* value for common ragweed in peanut was 68, indicating common ragweed was more competitive in peanut than corn, and the *I* value for jimsonweed in peanut was 10.7, indicating corn was more competitive than jimsonweed. An economic threshold for application of clethodim (Select at \$16.04 A^{-1} for chemical plus application) and sethoxydim (Poast at \$12.53 A^{-1} for chemical plus application) or (Poast Plus at \$13.66 A^{-1} for chemical plus application) would be 1 plant in every 25, 32, and 29 feet of crop row, respectively.

Weed Management in North Carolina Peanuts (*Arachis hypogaea* L.) with Diclosulam, Flumioxazin, and Sulfentrazone. S.B. CLEWIS*, D.L. JORDAN, W.J. EVERMAN, I.C. BURKE, W.E. THOMAS, W.L. BARKER, and J.W. WILCUT. North Carolina State University, Raleigh, NC.

Experiments were conducted at the Upper Coastal Plain Research Station near Rocky Mount and at the Peanut Belt Research Station near Lewiston-Woodville in 2002 and 2003 (5 total sites). Peanut injury was minimal (<5%) with all soil-applied programs. Sulfentrazone, diclosulam, and flumioxazin are of limited value (65-85%) for broadleaf signalgrass [*Brachiaria platyphylla* (Griseb.) Nash.], goosegrass [*Eleusine indica* (L.) Gaertn.], large crabgrass [*Digitaria sanguinalis* (L.) Scop.] and Texas panicum (*Panicum texanum* Buckl.) control. Imazapic postemergence (POST) activity on small annual grasses is a benefit in the Virginia-Carolina region with 93-98% control. Sulfentrazone and diclosulam were the best preemergence (PRE) options with 94% and 92% control respectively, for yellow nutsedge (*Cyperus esculentus* L.) and purple nutsedge (*Cyperus rotundus* L.) with flumioxazin being least effective at 70%. Diclosulam and flumioxazin were the best PRE option with 100% and 93% respectively, for common ragweed (*Ambrosia artemisiifolia* L.) control while sulfentrazone was the least effective at 65%. *S*-metolachlor plus sulfentrazone, diclosulam, or flumioxazin PRE options were statistically equivalent (83%, 94%, and 95% respectively) for common lambsquarters (*Chenopodium album* L.) control. *S*-metolachlor plus sulfentrazone, diclosulam, and flumioxazin provided similar levels of entireleaf morningglory [*Ipomoea hederacea*. var. *integriuscula* Gray], ivyleaf morningglory [*Ipomoea hederacea* (L.)

Jacq.], pitted morningglory (*Ipomoea lacunosa* L.), and tall morningglory [*Ipomoea purpurea* (L.) Roth] control (87%, 86%, and 88% respectively) when compared to *S*-metolachlor alone at 64%. Flumioxazin was the best PRE option for control of Palmer amaranth [*Amaranthus palmeri* S. Wats.] at 96%. Diclosulam was the best PRE option for control of eclipta (*Eclipta prostrata* L.) at 100%. Imazapic was the best POST option for eclipta with 95%. However, a prepackaged mixture of basagran and acifluorfen and imazapic POST were equivalent for all morningglory species (97% and 99% respectively) and Palmer amaranth control (93% and 97% respectively). *S*-metolachlor plus diclosulam PRE treatments yielded the highest peanut yields at 3190 kg/ha, but were statistically equivalent to *S*-metolachlor plus flumioxazin PRE at 3090 kg/ha. *S*-Metolachlor plus sulfentrazone and flumioxazin PRE were equivalent with 2780 and 3090 kg/ha, respectively. All treatments PRE provided better weed control and higher yields than *S*-metolachlor alone (2390 kg/ha). Imazapic was the highest yielding POST options at 3330 kg/ha, but statistically equivalent to a prepackaged mixture of basagran and acifluofen POST at 3058 kg/ha when averaged over locations and PRE herbicides. The addition of POST herbicides was beneficial to peanut yields when compared to systems without POST herbicides (2200 kg/ha). In order to maximize peanut yield potential both, PRE and POST herbicides were required.

Using Reduced and Full Cadre and Pursuit Rates in Combination with Broadleaf Herbicides for Effective Weed Control. W.J. GRICHAR*, Texas Agricultural Experiment Station, Beeville, TX 78102; P.A. DOTRAY, Texas Agricultural Experiment Station, Lubbock, TX 79409 and T.A. BAUGHMAN, Texas Cooperative Extension, Vernon, TX 76384.

Field studies were conducted during the 2003 and 2004 growing seasons in different areas of Texas to evaluate Cadre and Pursuit at one-half and full labeled rates alone or in combination with 2,4-DB, Storm, or Ultra Blazer for broadleaf weed control. Cadre alone at the one-half or full-rate controlled 75 to 87% tumble pigweed (*Amaranthus albus*) while Pursuit at the same rates provided variable control which ranged from 40 to 88%. Adding 2,4-DB to the one-half or full rate of Cadre improved tumble pigweed control to greater than 90% while adding 2,4-DB to the same rates of Pursuit improved tumble pigweed control to at least 83%. Adding Blazer or Storm to Cadre or Pursuit resulted in variable tumble pigweed control while Blazer, Storm, and 2,4-DB alone provided inconsistent control. Palmer amaranth (*Amaranthus palmeri*) control with Blazer, Cadre, Storm, Pursuit, or 2,4-DB alone was variable. Adding 2,4-DB or Storm to the one-half or full rate of Cadre improved control over those herbicides alone while the addition of Blazer did not. The addition of Blazer, Storm, or 2,4-DB to the one-half or full rate of Pursuit provided inconsistent control. Cadre or Pursuit alone at the one-half rate controlled ivyleaf morningglory (*Ipomoea hederacea*) 60 to 73% while the full rate controlled 73 to 91%. Blazer, Storm, or 2,4-DB alone controlled less than 50%. Adding Storm or Blazer to the one-half rate of Cadre improved control in one year but the addition of Blazer, Storm, or 2,4-DB to the full rate of Cadre did not

improve ivyleaf morningglory control over the full rate alone. Adding Blazer, Storm, or 2,4-DB to either the one-half or full rate of Pursuit did not improve control over Pursuit alone.

Physiological Behavior of Ignite Drift on Non-Target Crops. W.L. BARKER*, W.E. THOMAS, S.B. CLEWIS, I.C. BURKE, W.J. EVERMAN, and J.W. WILCUT. North Carolina State University, Raleigh, NC.

Ignite drift was evaluated in five peanut and six corn trials at locations in the coastal plain of North Carolina in 2003 and 2004. Studies used a randomized complete block design with 7 treatments, replicated 3 times.. Treatments were Ignite 1.67 EC at 0, 0.063, 0.125, 0.25, 0.5, 1, and 2 pt/A which correspond to 0, 1/32, 1/16, 1/8, 1/4, 1/2 and 1 times the normal use rate. Drift was simulated 45 days after peanut emergence and were in reproductive stages and corn was 22 inches tall. Photosynthesis activity and tissue samples were taken 24 hours after drift simulation to assess ammonia content, a possible indicator of plant injury by Ignite. Samples were subsequently placed on ice and kept frozen until they were assayed. A color-metric assay using a spectrophotometer was used to determine ammonia concentrations. Sample absorbance values were fitted to a standard curve. Injury was visually estimated on a scale from 0 to 100, 0 being healthy plants and 100 being complete plant death. In both corn and peanuts, increasing Ignite rates lead to increased crop injury and ammonia concentration and decreased yield and photosynthetic activity. Peanut yield was reduced 10% by only 15% the normal use rate. Peanut photosynthetic activity decreased rapidly dropping to 0 at only 25% normal use rates. Also in both species yield loss or ammonia concentration were not significantly different from nontreated plants and plants treated with <10% the normal use rate. Accumulation could be used as a diagnostic tool to determine Ignite drift. Although ammonia accumulation had no differences between non-treated plants and plants treated with 10% or less of the normal use rate, injury at the lower levels was biologically insignificant and did not have adverse effects on yield.

Reducing the Allergenic Properties of Peanut Extracts by Removing Peanut Allergens with Phytic Acids. S.Y. CHUNG*, E.T. CHAMPAGNE, USDA-ARS, SRRC, New Orleans, LA 70124.

People are allergic to peanuts because peanuts contain proteins called allergens. Removing these proteins from a peanut kernel or extract is thought to help reduce or prevent peanut allergy. Phytic acid, which functions as the chief storage form of phosphate and inositol in mature seeds, can chelate metals and form complexes with proteins in the presence of calcium. In this study, we hypothesized that phytic acid can form complexes with the peanut allergens in the extracts, and thus reduce the allergenic properties of extracts, after removal of the complexes. To support our hypothesis, we treated peanut extracts (proteins at 5 mg/mL) with different concentrations of phytic acid (0.5-5 mM) under different pH conditions (pH 3, 7, 8.5) for 10 min, and then centrifuged. The resultant supernatants were then subjected to SDS-

PAGE and inhibition ELISA, in which the allergenic properties of supernatants or their bindings to IgE antibodies from a pooled serum of peanut-allergic individuals were determined. Results showed that two major peanut allergens, namely Ara h 1 and Ara h 2, were precipitated by phytic acid (2-5 mM), while other proteins remained in the extract. The precipitation occurred only at pH 3 and 7, but not at pH 8.5. Overall, the phytic-treated extracts with precipitates removed had a lower IgE binding or allergenic property than the untreated. We concluded that phytic acids precipitated two major peanut allergens under acidic and neutral conditions, and thus reduced the allergenic properties of the peanut extracts after removal of the precipitates.

Peanut-based Texturized Meat Analogs: Formulation and Consumer Acceptability. D. REHRAH*, J. YU, M. AHMEDNA, and I. GOKTEPE, Department of Human Environment and Family Sciences, North Carolina A&T State University, Greensboro, NC 27411.

Peanuts are grown primarily for human consumption and as whole seed or processed to make peanut butter, oil, confectionery, peanut flour and other products. Peanut oil extraction involves taking over 85% of the oil out of the peanuts resulting in a de-oiled residue (by-product) which can be ground into defatted peanut flour (DPF). DPF has an excellent potential in food formulations because of the high protein content (45-50%). DPF is also an inexpensive by-product of peanut oil extraction which makes its use as a food ingredient cost effective. However, despite its high protein content, the use of DPF in human food remains limited. The objectives of this study were to 1) determine the optimum extrusion parameters and formulation for a peanut-based texturized meat analog (TMA), 2) develop new TMA products from DPF and 3) evaluate their consumer acceptability. A central composite RSM design was used to determine the optimal extrusion condition. Protein (55-65%), moisture (40-60%), screw-speed (60-100rpm), and barrel temperature (150-170°C) were used in 31 runs. Expansion ratio, Bulk density, Texture profile, Water absorption/solubility indexes of the extrudates were determined and used as indicators of product quality. Peanut-based TMAs produced at optimal extrusion conditions was flavored with beef flavor and used as meat replacement in microwavable hot pockets. The latter were evaluated using a difference from control test. The best formulation was subsequently evaluated by a 60-member sensory panel for flavor, texture, and overall-liking using a 9-point hedonic scale. Optimization studies revealed that the most important extrusion conditions are in descending order: protein-content, temperature, moisture, and screw-speed. Sensory panelists found peanut-based ground beef TMAs very similar to those of commercial soy-based ground beef analog and regular lean ground beef. The products containing peanut-based TMAs were highly acceptable with mean sensory acceptability ratings exceeding 7. Results showed that TMAs could be produced from inexpensive DPF and used to develop acceptable convenience foods. This new value-added use of DPF has the potential to enhance the sustainability and profitability of the peanut industry.

Functional Properties and Potential Applications of Peanut Protein Isolate/Concentrate. J. YU, REHRAH, M. AHMEDNA, and I. GOKTEPE*, Dept. of Human Environment & Family Sciences, 161 Carver Hall, Greensboro, North Carolina A&T State University, Greensboro, NC 27411.

Peanut flour is a high protein byproduct of peanut oil extraction. However, peanut flour remains underutilized and research is needed to develop new value-added products from this inexpensive resource. With the large and expanding ingredient and dietary supplement markets, there is a growing demand for low cost specialty protein isolates and concentrates. While most commercial protein isolates/concentrates are predominantly from soy and whey, peanut could represent a potential source of proteins with unique flavor and amino acid composition. The objectives of this study were to 1) develop a protein concentrate/isolate from peanut flour, 2) determine the functional properties of peanut protein concentrate (PPC), and 3) evaluate potential food application of PPC. Defatted peanut flour protein was isolated by a combination of chemical and physical separation procedures. PPC was dried by spray drying and evaluated for proximate composition and functional properties (protein solubility, emulsifying, water/oil binding, and foaming capacity) along with defatted peanut flour and soy protein isolate. The PPC contained over 85-90% protein versus 50% protein in the defatted peanut flour. The PPC had a solubility profile similar to that of peanut flour, with minimum solubility observed at pH 4.5 and maximum solubility at pH >10. PPC showed higher emulsifying, water and oil binding capacities but lower foaming capacity than peanut flour. This suggests that the PPC could be used in food formulations requiring high emulsifying capacity and water/oil binding capacities such as salad dressing, sausages, breads, and cake extenders, but would not be suitable for applications requiring high foaming capacity. PPC could be a good source of protein fortification for a variety of food products including dietary supplements and could help combat protein deficiency in many parts of the world, particularly developing countries. The production of PPC could also add value to defatted peanut flour, the by-product of peanut oil production.

Effect of Power Ultrasound on Oxidative Stability of Roasted Peanuts. P. WAMBURA, W. YANG*, L. WILLIAMS, Department of Food and Animal Sciences, Alabama A&M University, Normal, AL 35762; and F. McGEOVERN, Omnion, Inc., Rockland, MA 02370.

Power ultrasound, well-known for its cleaning effect due to sonic cavitation, was used in this study for removing surface lipid of roasted peanuts to minimize lipid oxidation and extend shelf life. The effect of sonication on oxidative stability of roasted peanuts was investigated by measuring the oxidative stability index (OSI) (AOAC Method Cd 12 B-92) in triplicate using a lipid oxidative stability index instrument (Omnion, Rockland, MA). Georgia green runner peanut was roasted in an oven at 177^{o}C for 20 min. Roasted samples, 50 g each, were subjected to

sonication in 100 ml hexane at room temperature for 4 durations: 1, 5, 10 and 30 min in a sonicator (Zenith Ultrasonics, Inc., Norwood, NJ) of 25, 40 and 80 kHz frequencies. Both the control (non-sonicated) and sonicated samples were stored in an accelerated shelf life testing chamber set at 37^{o}C. The OSI values were determined at 110^{o}C with a set air flow rate of 120 mL/min. Results after 12-week storage in the testing chamber showed that the OSI values for the samples sonicated at 1, 5, 10 and 30 min were 4.38, 4.43, 4.78 and 5.20 h, respectively, while the OSI value for the control sample was 3.7 h, signifying an increased storage stability of approximately 18%, 19%, 29% and 40%, respectively, for the sonicated peanuts.

Incorporating Bahiagrass Rotations into Peanut Cropping Systems in North Florida to Manage Peanut Diseases. F.K TSIGBEY*, J.J. MAROIS, D.L. WRIGHT, and T.W. KATSVAIRO. University of Florida, North Florida Research and Education Center, Quincy, FL 32351.

Crop rotations generally reduce plant diseases thus the development of a bahiagrass-peanut-cotton rotation as a possible replacement for the conventional peanut-cotton rotation with the intention of managing the peanut diseases in north Florida. Disease ratings were done in 2003 and 2004. The average TSWV incidence was higher for the peanut/cotton rotation (21.7%) compared to the bahiagrass rotation (10.2%) in 2003 and similarly in 2004 the highest incidence of (71%) of TSWV was recorded on the conventional rotation, while the bahiagrass-peanut rotations had a lower incidence (32%). Bahiagrass reduced *Cercospora* leaf spot progression and severity in both years. On a scale of 1-10, leaf spot severity at harvest was 3.8 for bahiagrass rotated peanuts compared to 5.5 in the peanut/cotton rotation. Disease increases between consecutive scoring times were higher for the peanut/cotton rotations than for the bahiagrass rotation throughout the season. White mold (*Sclerotium rolfsii*) incidence was higher at all scoring times for the peanut/cotton rotation compared to the bahiagrass rotated peanuts. Peanut rust incidence between the rotations was not significant. The bahiagrass rotation increased pod yield of peanut over the traditional peanut/cotton rotation. Soil health improvement after bahiagrass could have supported healthier peanuts which were more tolerant to disease.

Evaluation of the CSM-CROPGRO-Peanut Model for Predicting Growth and Development of Three Peanut Cultivars for Different Planting Dates in Thailand. P. BANTERNG*, G. HOOGENBOOM, Department of Biological and Agricultural Engineering, The University of Georgia, Griffin, Georgia 30223-1797, USA; A. PATANOTHAI, Department of Agronomy, Faculty of Agriculture, Khon Kaen University, Khon Kaen 40002, Thailand; and P. SINGH, Soils and Agroclimatology Division, International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Patancheru, Andhra Pradesh 502 324, India.

The crop simulation model CSM-CROPGRO-Peanut has been

developed as an information technology tool to support strategic decision making for research, crop production and land use planning. Evaluation of a model is the first step to establish its credibility and to be able to use the model for local applications. The objective of this study was to evaluate the potential of the CSM-CROPGRO-Peanut model in predicting growth and development of three peanut cultivars grown for different planting dates. The peanut cultivars used in this study were the small-seeded Spanish type, i.e., KK 5, and the large-seeded virginia type, i.e., KK 60-3 and KKU 72-1. Three different planting date experiments were conducted at Khon Kaen University, Thailand. These were June 9, 2002 (rainy season 2002), December 15, 2002 (dry season 2002/2003) and May 8, 2003 (rainy season 2003). Experimental data that were collected included plant growth and development, soil surface and profile characteristics, local weather conditions and crop management as required for the model. The results showed that the model was able to simulate crop growth and development of the three cultivars for the three different planting dates that were in good agreement with the observed values for most of the crop characteristics. Some of the differences between simulated and observed results might be due to incidences of pest and diseases in the trials or due to some variation in the observed data. Overall, the CSM-CROPGRO-Peanut model appears to be a useful tool to quantify peanut growth and development for different planting dates in Thailand.

A Genetic Linkage Map of Cultivated Peanut (*Arachis hypogaea* L.) Based on AFLP and SSR Markers. G.H. HE*, G.Y. JIANG, and C.S. PRAKASH, Department of Agricultural Sciences, Tuskegee University, AL 36088; M.V.C. GOWDA, Department of Genetics and Plant Breeding, University of Agricultural Sciences, Dharwad, India; and G.X. YI, Department of Agronomy, China Agriculture University, Beijing, China.

A genetic linkage map for cultivated peanut (*Arachis hypogaea* L.) has not been developed so far because of the paucity of the availability of DNA markers. We have reported earlier that AFLP markers can identify DNA polymorphism in the cultivated peanut. Recently, we have developed a few hundred SSRs that are useful in detection of genetic variation in peanut. Thus, the objective of this study was to construct a genetic linkage map of the cultivated peanut using AFLP and SSR markers. Seven hundred sixty-eight AFLP primer pairs including 256 of each EcoRI/MseI, PstI/MseI, and HandIII/MseI combination, 147 SSR markers, 2 RAPD markers, and 8 resistance gene analogs (RGAs) from soybean were used to test polymorphism between two parental lines, VL-1 (Valencia type) and 110 (Spanish bunch), developed in India. One hundred sixty-two polymorphic markers including 125 AFLPs, 35 SSRs, 1 RAPD, and 1 RGA were used to construct a genetic linage map based on 94 F6 recombinant inbred lines (RILs) derived from a cross of these two lines. Fewer markers detecting polymorphism than expected may be due to the fact that there is not enough genetic diversity between the two parental lines. One hundred thirty-four markers (100 AFLPs, 32 SSRs, 1 RAPD, and 1 RAG) were mapped on 17 linkage groups spanning 1605 cM. The PstI/MseI and HandIII/MseI primer pairs

detected more genetic variation than EcoRI/MseI combinations. Clustering of AFLP markers was observed, while SSR markers were evenly distributed. The SSR markers should be the most useful tools to construct a genetic linkage map for cultivated peanut.

MINUTES OF THE BOARD OF DIRECTORS MEETING
37th Annual Meeting, Renaissance Hotel
Portsmouth, Virginia
July 12, 2005

James Grichar, President, opened the meeting at 7:05 p.m. by welcoming everyone.

President Grichar called upon Ron Sholar, Executive Officer, to present the minutes of the last Board of Director's Meeting conducted at the 2004 Annual Meeting held in San Antonio, Texas. The minutes were approved as reported in the 2004 Proceedings, Volume 36. Dr. Sholar reported that the society remains in sound financial condition.

The following reports were made and approved by the Board.

Nominating Committee – Ben Whitty – The Nominating Committee made the following recommendations to the Board of Directors:

Stanley Fletcher - President Elect
Todd Baughman - State Representative, Southwest area
Jim Elder – Industry Representative, Manufactured Products
Emory Murphy - State Representative, Southeast area

Board members were reminded that nominations from the floor may be made. New members of the Board of Directors will be voted on by the general membership at the business meeting on Friday morning.

Publications and Editorial Committee

Michael Franke turned the floor over to Dr. John Wilcut, the new Editor of *Peanut Science*, who led a discussion on moving from paper publication of *Peanut Science* to electronic publication.

Dr. Wilcut reported that he has been in communication with Allen Press regarding electronic publication of *Peanut Science*. Dr. Wilcut reported that a lot of libraries support Allen Press. The Weed Science Society of American uses Allen Press and this is how Dr. Wilcut became associated with them.

The Allen Press process from acceptance to publication requires 6 to 8 weeks. Dr. Wilcut has been exploring the possibility of entering into an agreement with Allen Press where they would receive submitted articles on line and then publish Peanut Science electronically. The start up fee is $5,000 plus $8,000 to $9,000 for about 30 manuscripts (2 issues for each volume). These amounts would be in line with current costs. Paper copies would no longer be published once we go online. There are some opportunities for revenue enhancement by going on line and these opportunities need to be explored. There are systems that allow for revenue to be paid each time an article is downloaded. Dr. Wilcut

reported that he is Editor for *Weed Technology* and it is published electronically. There was discussion as to whether APRES should go with just electronic submission of articles by authors or to do that and to go to electronic publication of *Peanut Science*. Dr. Wilcut recommended to switch to maximum electronic technology (electronic submission and electronic publication) if the change from paper publishing is to be made. Members can still print off the articles if they desire. More societies which are publishing electronically are not publishing a paper copy. Dr. Wilcut reported that he expects the number of papers submitted to increase with electronic publishing due to reduced turnaround time from submission to publication, and that the number of international submissions will definitely increase. Other journals have had this experience.

A question was asked about how often the articles would be posted and Dr. Wilcut responded that he understood that they would be posted as received but he would need to check on this. Electronic publishing offers the opportunity for authors to get their papers cited early. Paper publishing requires a large inventory of submitted papers whereas electronic publishing requires a smaller inventory.

Dr. Wilcut stated that he was unsure if the $8000 to 9000 included electronic submission and electronic publishing and he would have to get more information on that.

Dr. Sholar pointed out that even if the society goes to electronic publishing, we will still have to collect page charges to remain financially viable. Little has been collected in the way of page charges in the last 2-3 years.

A comment was made that the turn around time from submission to publication should be reduced significantly with electronic publishing. There was discussion that indicated that the cost of electronic publishing will be equal to paper publishing. It is likely that it will not be possible to publish both electronically and by paper.

Dr. Sholar brought the Board up to date on the status of the unpublished issues of Peanut Science:

- January – June Issue, 2003 (Pierce) (Vol 30 #1) – received by members in March
- July – December Issue, 2003 (Pierce) (Vol 30 #2) – received by members in July
- January – June Issue, 2004 (Lang) (Vol 31 #1) – received by members in July
- July – December, 2004 (Lang) (Vol 31 #2)
- January – June Issue, 2005 – can be published electronically

Dr. Wilcut reported that there are five papers accepted for the first issue of 2005 and five more being reviewed but no papers for the second issue of 2005. We must make a decision now and act upon it – we need to rebuild the confidence of our membership in getting their papers

published.

Dr. Wilcut discussed the fact that Allen Press is a commercial entity and they are in the business to make money. We can expect them to come to us from time to time with suggestions on how we can increase our revenues because they will also make money from these ideas.

A motion was made to go to electronic publication for the first issue (Jan – Jun 2005) of Peanut Science for 2005. The motion was seconded and passed.

Finance Committee

Dr. Johnson reported that the Finance Committee met and Dr. Sholar presented a proposed budget for the society. There were only two members present. Todd Baughman and James Grichar also attended. There are several items to point out for the Board's review:

Dr. Sholar presented a working budget that compared finances of the current year with the proposed budget for the upcoming year.

Highlights for the FY 05-06 year are as follows:

1 – Anticipated increased revenues from meeting registration and dues increase are showing up the proposed budget
2 – The proposed budget includes page charge income from Peanut Science. There has been little income over the past three years that resulted from page charges
3 – The budget reflects continued support from the National Peanut Board as a result of the agreement to hold a joint annual meeting
4 – The elimination of the Editorial Assistant position will result in a savings
5 – A cost of $1,000.00 to assist in electronic publication of the Peanut Research Newsletter

The Finance Committee discussed compensation for Dr. Stalker, former editor of Peanut Science, for the last half of the fiscal year (Jan – Jun 05). The Finance Committee recommended that he not be compensated for this period of time.

We are working on getting out of the hole we have been in for several years. Peanut Science is now being published and we hope to be caught up by the end of the year.

There was much discussion about the fact that the publishing of Peanut Science has been behind schedule for the past three years and how much the former editor should be compensated for the last half of the fiscal year (Jan – Jun 05).

The Board of Directors voted to pay Dr. Stalker, former Peanut Science Editor, for six months (Jan – Jun 05) and the Editorial Assistant an amount that equaled three months salary for the same period.

The amended budget was approved by the Board of Directors.

Carroll Johnson requested approval to publish the budget in the newsletter and the request was approved.

Ad Hoc on Improving the Financial Status of APRES Committee Report – Chris Butts

The objective given to the committee was to recommend ways to improve the financial state of the society. The committee members were:

Chris Butts	James Hadden
Dan Gorbet	Richard Rudolph
Marshall Lamb	Todd Baughman
David Jordan	Fred Shokes

The final report was made on Jan 18th and seven recommendations were presented. They were as follows:

1 – Consolidate the Executive Officer and Editor positions into a single position, consider consolidating the Executive Officer Administrative Assistant and Editorial Assistant positions into a single position, and consider consolidating the two offices at a single location
2 – Move immediately to initiate electronic publishing of Peanut Science,
3 – Refund 2003 dues to institutional members and differential postage fees to overseas members due to non delivery of 2003 issues of Peanut Science
4 – Revise current dues structure to include Gold, Silver, Platinum, Life Time memberships based on actuarial tables
5 – Instruct the Editorial and Publications Committee to resurrect the Peanut Research Newsletter for electronic publication and ..improve the web site,
6 – Partner or seek opportunities to partner with other societies or other groups to cut meeting cost,
7 – The Board of Directors should act on this report prior to the 2005 annual meeting and if a vote of the membership is required, to conduct that vote
by the membership, suggest doing this by email.

No further action was taken by the Board of Directors on the recommendations of the Ad Hoc committee.

Peanut Quality Committee – Victor Nwosu

No report given.

Public Relations Committee – Bob Sutter

Bob Sutter reported that the committee met at 12:30 in the Lee Room. Members attending were Bob Sutter, Dan Gorbet and Kevin Calhoun.

In preparation for the meeting, the Public Relations Committee encouraged colleagues to attend our meeting and distributed press releases in our respective states.

The committee wants to thank the National Peanut Board for their assistance in publishing the joint annual meeting.

Bailey Award Committee – Todd Baughman

Todd Baughman reported that the Bailey Award Committee attended to its business prior to our annual meeting. Information and paper work were sent out regarding the award and papers were requested from 16 sections but only six papers were received and accepted. The winner of the Bailey Award from the 2004 meeting is John Wilcut et al in the Weed Science section.

Fellows Committee – C. Corley Holbrook

The Fellows Committee met before the annual meeting. There were two nominees that were unanimously approved by the Fellows Committee and were subsequently elected to membership by the Board of Directors. They are Dr. Peggy Ozias-Akins of the University of Georgia and Mr. James Ronald Weeks of Auburn University.

Site Selection – Fred Shokes

Dr. Shokes reported that the room night requirement for Portsmouth has been safely met for this year's meeting, partly due to the alliance with NPB. He reported that the 2006 meeting will be held at the Hyatt Regency in Savannah, GA, July 8-16th. The 2007 meeting will be in Alabama but a location and contract have yet to be worked out. We are looking at Birmingham and Mobile, Alabama and the western panhandle of Florida. There are many factors to consider – hotels not able to handle a group our size, unless we go back to the Grand Hotel and our normal time frame is not available there. We are also considering the last week of June for hotel availability. The 2008 meeting will probably be in Oklahoma City, OK.

The Site Selection Committee brought a recommendation to consider a June meeting for 2007. There was discussion that moving to the last week of June presents problems for field researchers.

Austin Hagan discussed the hotels that the Alabama group is considering in several cities.

Dr. Sholar reported that we still have two to three months to come up with a firm offer and then present it to the Board for approval. The Alabama group will continue to work with potential hotels for the 2007 meeting and will present a proposal to the Board of Directors in the next few weeks.

Coyt T. Wilson Distinguished Service Award Committee – Charles Simpson

No report given.

Joe Sugg Graduate Student Award Committee – Bob Kemerait

Dr. Kemerait reported that the Joe Sugg Graduate Student Award Committee met at 12:00 noon in the Washington Room. He reported that there were seven (7) entries for the 2005 meeting. He reported that he had sent emails to each student prior to the meeting and also sent the necessary papers for the competition.

Dr. Kemerait reported that it is recognized that non-English speaking members have a difficult time and the committee hopes that in the process, they are not overlooked. The committee wants to recognize outstanding work while insuring fairness to all participants. The committee will encourage judges to avoid penalizing students from non English speaking countries. The committee also feels that a poster competition should receive some consideration. There are more and more posters being presented at the annual meeting.

Dow AgroSciences Awards Committee – John Baldwin

No report presented.

Program Committee – Patrick Phipps

The meeting is going well and hope everyone will enjoy the presentations. NPB has done a great job of preparing their part of the program and is working with us and we hope the joint meeting will be enjoyed by all.

Other business

Dr. Stalker has stated a desire to be released from serving as the liaison to American Society of Agronomy. He normally attends their meetings (they meet once a year) and gives us a report. This is not a required position and is not mandated anywhere in the By-laws.

The Board of Directors approved releasing Dr. Stalker as the American Society of Agronomy Liaison representative and to discontinue the position.

The Board next considered several changes to the By-Laws. Dr. Sholar passed out documents that related to proposed changes to the By-Laws. All proposed changes were presented to the Board of Directors more than 30 days in advance of the meeting to meet the By Laws requirement for amending the By Laws.

Proposed Changes to the By-laws:

1. The American Peanut Council requested that the Director of Science and Technology of the American Peanut Council serve on the Board of Directors instead of the President as is prescribed in the By Laws.

The Board of Directors approved a change to the By Laws that would permit the President or a designee of the American Peanut Council to serve on the Board of Directors. This change to the By Laws will require approval of the membership at the business meeting.

2. The duties of the Editor of Peanut Science should be included in the Section 8 of the By-laws. This would be consistent with the presentation of the duties of the Executive Officer in the By Laws.

The Board of Directors approved the change to the By Laws and the final vote will be made by the membership at the business meeting.

3. The National Peanut Board (NPB) has made a formal request to have a voting member on the APRES Board of Directors.

The NPB represents a large body of growers and the Industry Representative – Production position on the Board of Directors has always been considered as a "grower" position. APRES has had very few members whose occupation is as a grower.

There was significant discussion on this proposal. The following was discussed:

- Should we consider a grower as an Ex-Officio member on the Board of Directors? We do need their input but we are a research society.
- Would the Board be weighted too heavily in one direction?
- How long would the member serve?
- How would having a grower on the Board be beneficial to APRES?
- APRES has no member on the NPB Board of Directors.

Discussion ensued on the request of the Texas Peanut Producers Board to include a grower representative from each of the three main growing regions on the APRES Board of Directors. Shelly Nutt, Executive Director of the Teas Peanut Producers Board spoke on behalf of the proposal. Some members of the Board expressed concern at expanding to such a large degree by adding three grower representatives. There was also discussion that growers are already represented in the Industry – Production member position that currently exists on the Board of Directors.

After much discussion, the grower representatives present, led by Shelly Nutt, modified their request to have a member on the Board of Directors. They requested that in lieu of naming three grower members

to the Board of Directors, a *Grower Committee* be established to meet during the APRES annual meeting. This committee would consider grower concerns and would report those concerns to the Industry - Production member on the Board of Directors. This proposal was unanimously approved by the Board of Directors. The President will appoint this committee for the 2006 meeting.

Discussion returned to the request by the NPB to have a Board member on the APRES Board. No one was present from the NPB to discuss their proposal.

There was discussion that the proposal had merit but that APRES lacked experience to make a sound decision at this time without having completed a joint meeting with the NPB. Member input and feedback are needed following this meeting to aid in assessing the merits of this proposal.

The Board deferred action on the request until there has been an opportunity to evaluate the joint meeting and to evaluate opportunities for a strategic alliance with the NPB. The Board will assess the situation again in early spring and determine at that time if there is any reason to approve the proposal.

4. It is believed by some members that differential postage fees to foreign members should be reimbursed due the fact that Peanut Science is behind schedule. This fee only partially covers the actual mailings because the fee has not been raised in years and we have not considered raising it because we want the foreign memberships. However, they will get their journals when they are published and we will be out the shipping charges.

The Board voted to not reimburse the differential postage fees.

Other Business

A question has been asked about combining registration and membership fees into one fee so that members can be reimbursed for the entire amount and not just registration fee.

This issue will be looked into and see what can be worked out before the next annual meeting.

President James Grichar thanked the Board of Directors for their hard work and dedication to the society and expressed the hope that everyone would enjoy the meeting.

The meeting was adjourned at 9:26 pm by President Grichar.

OPENING REMARKS BY THE PRESIDENT AT THE 2005 BUSINESS MEETING of APRES – President James Grichar
July 15, 2005

State of the Society

I would like to welcome everyone here for the 2005 APRES business meeting. Thanks for taking the time to stay and attend this very important function of APRES. First, I would like to thank the many people that helped me during my term as President. Irene Nickels and Ron Sholar provided valuable advice and information whenever I gave them a call. I really could not have made it without Irene's help and guidance with any questions that I had for her. Also I would like to thank the various committees that served and helped make many of the important decisions for the continued success of this organization. I would especially like to mention the Ad Hoc Committee headed up by Dr. Chris Butts for all their time and effort spent on making recommendations for the changes to the workings of this organization. It has been a difficult time for APRES but I feel that the changes which have been made or in the process of being made will lead to the continued success of this organization for years to come. Again, thanks for everyone's help during my term as president.

BUSINESS MEETING AND AWARDS CEREMONY
AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY
Renaissance Hotel
Portsmouth, Virginia
July 15, 2005

Meeting called to order by President James Grichar, President.

President Grichar called upon Ron Sholar, Executive Officer, to present the minutes of the last Board of Director's Meeting conducted at the 2004 Annual Meeting held in San Antonio, Texas. The minutes were approved as reported in the 2004 Proceedings, Volume 36. Dr. Sholar reported that the society remains in sound financial condition.

The following reports were made and approved by the Board.

New Business:

Ben Whitty, Chair of the Nominating Committee, presented the following nominations for consideration by the general membership.

Stanley Fletcher - President Elect
Todd Baughman - State Representative, Southwest area

Jim Elder – Industry Representative, Manufactured Products

Dr. Fletcher requested an explanation as to why Emory Murphy's name was not submitted for consideration by the membership since it was approved by the Board of Directors at the business meeting on Tuesday evening, July 12, 2005. President Grichar called on the Executive Officer to explain the sequence of events that resulted in this nomination not being submitted to the members.

Subsequent to the Board of Directors meeting on July 12th, it was realized that the approval of Mr. Murphy's nomination as the State Representative, Southeast area was inconsistent with the manner in which the By Laws had been historically applied. Each of the State Representative positions (Southeast, VC, and Southwest) had been filled exclusively by State Land Grant University employees engaged in either peanut research or education. This had been confirmed with a senior representative from each of the three growing regions. Each stated that it was their understanding that the intent of the By Laws was that the State Representative positions would always be filled by a State Land Grant University employee. As a non state university employee, Mr. Murphy did not meet the criteria according to the manner in which the By Laws had consistently been applied since the forming of APRES.

The Board had asked Jay Williams, whose term as the state employee representative for the Southeast area was expiring in 2005, to remain in that position for up to an additional year. This would allow time for study as to whether to expand the definition of state employee.

President Grichar called for nominations from the floor for the positions opening on the Board of Directors (President elect, State Representative, Southwest area, and Industry Representative, Manufactured Products. There were no nominations from the floor and all nominees were elected.

Dr. Fletcher resigned immediately as President elect stating that he was doing so due to the lack of acceptance of the nomination of Emory Murphy as State Representative, Southeast area. President Grichar called for nominations from the floor for the position of President elect. Dr. Albert Culbreath, University of Georgia, was nominated and was unanimously elected by the members.

Publications and Editorial Committee Report

The membership voted to proceed with signing a contract with Allen Press for the electronic publication and distribution of *Peanut Science*. John Wilcut will negotiate a contract for electronic publication. The contract will be signed by the Executive Officer and the President.

Finance Committee Report

The membership approved a budget of;
Anticipated income – $146,700
Anticipated expenses – $131,810
Difference – $14,890

Bailey Award Report

The winners of the Bailey Award from the 2004 meeting are J.A. Wilcut, A.J. Price, S.B. Clewis and J.R. Cranmer in the Weed Science section for their paper entitled, "*Physiological Behavior of Root-Absorbed Flumioxazin in Peanut, Ivyleaf Morninglory, and Sicklepod*".

Fellows Report

Dr. Peggy Ozias-Akins of the University of Georgia and Mr. James Ronald Weeks of Auburn University were elected to Fellowship in APRES.

Site Selection Report

The 2006 annual meeting will be held at the Hyatt Regency in Savannah, GA, July 8-16th. The 2007 meeting will be in Alabama but a location and contract have yet to be worked out. The 2008 meeting will be in Oklahoma City, OK.

Coyt T. Wilson Distinguished Service Award Report

Dr. Tom Whitaker, USDA, North Carolina was presented with the Coyt T. Wilson Distinguished Service Award.

Joe Sugg Graduate Student Award Committee Report

Winners of the Joe Sugg Graduate Student Award were announced as:
First Place – D.L. Smith, North Carolina State University
Second Place – S.K. Gremillion, University of Georgia

Dow AgroSciences Awards Committee Report

The following winners of the DowAgroSciences Awards were announced:

Dow AgroSciences Award for Research – Dr. Bill Branch, University of Georgia

Dow AgroSciences Award for Education – Dr. Eric Prostko, University of Georgia

Other business:

The members considered several changes to the By-Laws. Documents that related to proposed changes to the By-Laws were distributed. All proposed changes were presented to the Board of Directors more than 30 days in advance of the meeting to meet the requirement for amending the By Laws. The proposed changes to the By Laws were approved by the Board of Directors at their July 12th meeting for submission to the membership at the business meeting on July 15th.

Proposed Changes to the By-laws:

1. The American Peanut Council requested that the Director of Science and Technology of the American Peanut Council serve on the Board of Directors instead of the President as is prescribed in the By Laws.

The Board of Directors supported a change to the By Laws that would permit the President or a designee of the American Peanut Council to serve on the Board of Directors.

This change to the By Laws was approved by the membership at the business meeting.

2. The duties of the Editor of Peanut Science should be included in Section 8 of the By-laws. This would be consistent with the presentation of the duties of the Executive Officer in the By Laws.

This change to the By Laws was approved by the membership at the business meeting.

The meeting was adjourned at 9:39 am by President Grichar.

FINANCE COMMITTEE REPORT

The annual meeting of the APRES Finance Committee was held on 12

July 2005 in Norfolk, VA. The following committee members were present; Carroll Johnson, Fred Shokes, and Ron Sholar – Ex-Officio. Attending as proxy for Hassan Melouk was Kelly Chenault. Also in attendance were James Grichar and Todd Baughman. Absent were John Beasley, John Altom, Hassan Melouk and Richard Rudolph.

A proposed budget was presented by Ron Sholar, comparing FY 2004-2005 with the progosed FY 2005-2006 budget. The proposed FY 2005-2006 budget has the following changes of significance:

1. Anticipated revenues reflect the increase in meeting registration fee to $200 and annual dues to $80.
2. Anticipated revenue from page charges for Peanut Science publication.
3. Contribution of $10,000 from the National Peanut Board.
4. Elimination of the Editorial Assistant position.
5. Allocation of $1,000 for Peanut Research – the APRES electronic newsletter. If there are no newsletter expenses in FY 2005-2006, this unspent amount will be kept in the general account.

Other proposed items:

The Finance Committee recommends that the second half (January through June 2005) of the Editor's compensation for FY 2004-2005 not be paid.

It was the general opinion of the Finance Committee and interested APRES members present that the proposed budget is addressing recommendations of the Ad-hoc Committee and their strategic plan. Incremental changes in the budget, staffing, and over-all operations are preferred at this point.

Respectfully submitted by,
W.C. Johnson, III, Member of the Finance Committee

2005-06 BUDGET

RECEIPTS	
Registration	$ 44,000
Membership Dues	27,000
Contributions – Ice Cream Social	11,000
Contribution – Dow AgroScience	5,000
Contribution – Bayer Fund Replenishment	4,000
Contribution – Syngenta	5,000
Contribution – National Peanut Board	10,000
Differential Postage	1,000
Interest	1,000
Peanut Science & Page Charges	38,000
Advances in Peanut Science	400
Peanut Science & Technology	300
Quality Methods	0
Proceedings	0
Spouse's Program	0
Misc Income	0
Total Receipts	**$146,700**

EXPENDITURES	
Annual Meeting	$ 20,000
Awards (Coyt Wilson, Dow AgroScience, Joe Sugg)	4,000
CAST Membership	600
CAST Travel	0
Corporation Registration	300
Legal Fees (tax preparation)	800
Professional Services – Executive Officer	18,630
Professional Services – Secretarial Services	19,500
Professional Services – Peanut Science Editor	18,630
Peanut Science Publishing	29,000
Peanut Science – set up fee for article submission (electronic)	6,500
Proceedings	600
Peanut Research	1,000
Travel – Officers	2,000
Office Expenses	3000
Postage	2,500
Travel – Bayer – Prog for Ext Agents	4,000
Spouse Program	750
Misc	0
Total Expenditures	**$131,810**

2004-05 BALANCE SHEET

ASSETS	June 30, 2004	June 30, 2005
Petty Cash Fund	$ 101.58	473.90
Checking Account	47,096.68	75,691.03
Certificate of Deposit #1	0.00	0.00
Certificate of Deposit #2	0.00	0.00
Certificate of Deposit #3	10,741.51	10,864.81
Certificate of Deposit #4	14,034.90	14,196.09
Certificate of Deposit #5	0.00	0.00
Certificate of Deposit #6	15,314.66	15,497.96
Certificate of Deposit #7	13,166.49	13,324.15
Certificate of Deposit #8	5,861.37	5,941.32
Money Market Account	1,861.25	1,865.93
Savings Account (Wallace Bailey)	426.52	246.52
Bayer Account	12,020.90	11,058.39
Computer and Printer	1,445.16	1,146.16
Peanut Science Account (Wachovia Bank)	3,784.05	3,784.05
Inventory of PEANUT SCIENCE & TECHNOLOGY Books	2,650.00	2,120.00
Inventory of ADVANCES IN PEANUT SCIENCE Books	7,460.00	6,770.00
TOTAL ASSETS	**$135,965.07**	**$162,980.31**
Liabilities		
No Liabilities	0.00	0.00
Fund Balance	$135,965.07	$162,980.31
TOTAL LIABILITIES & FUND BALANCE	**$135,965.07**	**$162,980.31**

STATEMENT OF ACTIVITIY FOR YEAR ENDING 06/30/04

RECEIPTS	**June 30, 2004**
Advances Book	$ 415.52
Ann Mtg Reg	33,200.00
Award Income	0.00
Contributions – General	9,350.00
Contribution – Dow AgroSciences	5,500.00
Contribution – Bayer CropScience	3,281.93
Contribution – NPF	5,000.00
Differential Postage	1,088.00
Dues	15,532.00
Interest	1,457.54
Misc Income (return batteries/extra cash from mtg reg)	16.37
Peanut Research	0.00
Peanut Science Page Charges	6,392.60
Peanut Science & Technology	374.02
Proceedings	0.00
Quality Methods	60.00
Spouse Reg	0.00
Transfer	0.00
TOTAL RECEIPTS	**$81,667.98**

EXPENDITURES	
Advances in Peanut Science	$ 0.00
Annual Meeting	16,056.15
Awards (Dow, Coyt Wilson, Joe Sugg)	4,308.98
Bank Charges	90.00
CAST Membership	1,001.64
Corporation Registration	230.00
Exec Off	15,999.96
FICA/Medicare	2,432.02
Legal Fees	626.00
Miscellaneous	0.00
Office Expenses	2,739.12
Oklahoma Withholding	375.00
Peanut Research	0.00
Peanut Science	33,448.00
Peanut Science & Technology	0.00
Postage	1,339.41
Proceedings	300.00
Refund	0.00
Sales Tax	231.75
Secretarial Services	15,790.65
Spouse Program Expenses	0.00
Travel, Exec Off, Sec	1,282.23
Travel, Bayer	3,709.96
Transfer	0.00
TOTAL EXPENDITURES	**$99,960.87**
2004 EXCESS EXPENDITURES OVER RECEIPTS	**-$18,292.89**

STATEMENT OF ACTIVITIY FOR YEAR ENDING 06/30/05

Receipts	
Advances Book	$ 720.00
Ann Mtg Reg	43,950.00
Award Income	0.00
Contributions – General	17,800.00
Contribution – Dow AgroSciences	5,500.00
Contribution – Bayer CropScience	7,144.05
Contribution – NPF	5,000.00
Contribution – NPB	10,000.00
Differential Postage	1,325.50
Dues	26,165.00
Interest	821.06
Misc Income (Florida state refund from 1996 ann mtg)	185.00
Peanut Research	0.00
Peanut Science Page Charges	4,168.00
Peanut Science & Technology	557.50
Proceedings	13.00
Quality Methods	46.00
Spouse Reg	230.00
Transfer	0.00
TOTAL RECEIPTS	**$123,625.11**
Expenditures	
Advances in Peanut Science	$ 0.00
Annual Meeting	18,973.77
(Entertainment – 400.00, Program – 834.78, Spouse – 40.00 Supplies/Equip – 3,242.82, Breaks/Meals – 14,456.17)	
Awards (Dow, Coyt Wilson, Sugg)	3,734.10
Peanut Science	19,880.66
Proceedings	400.00
Peanut Research	0.00
CAST Membership	588.00
Corporation Registration	130.00
Legal Fees	658.00
Misc (retirement gift for Dr. Stalker)	150.00
Prof Services - Exec Off	16,640.04
APRES portion of FICA/Medicare	1,272.96
Prof Services – Admin Assist	16,345.92
APRES portion of FICA/Medicare	1,250.40
Oklahoma Withholding	1,590.00
Travel (Exec Off, Admin Assist)	2,812.49
Office Expenses	3,020.00
Postage	1,032.30
Bank Charges	72.75
Travel, Bayer	8,128.64
Spouse Program Expenses	40.00
Sales Tax	.84
TOTAL EXPENDITURES	**$95,090.87**
2005 EXCESS RECEIPTS OVER EXPENDITURES	**$28,534.24**

ADVANCES IN PEANUT SCIENCE SALES
REPORT 2004-05

Beginning Inventory		746
1st Quarter	68	678
2nd Quarter	1	677
3rd Quarter	0	677
4th Quarter	0	677
TOTAL	**69**	

677 REMAINING BOOKS X $10.00 (BOOK VALUE) = $6,770.00 total value of remaining book inventory.

Fiscal Year	Books Sold
1995-96	140
1996-97	99
1997-98	66
1998-99	34
1999-00	45
2000-01	33
2001-02	27
2002-03	35
2003-04	37
2004-05	69

PEANUT SCIENCE AND TECHNOLOGY
SALES REPORT 2004-05

Beginning Inventory		265
1st Quarter	51	214
2nd Quarter	1	213
3rd Quarter	1	212
4th Quarter	0	212
TOTAL	**53**	

212 remaining books x $10.00 (book value) = $2,120.00 total value of remaining book inventory.

Fiscal Year	Books Sold
1985-86	102
1986-87	77
1987-88	204
1988-89	136
1989-90	112
1990-91	70
1991-92	119
1992-93	187
1993-94	85
1994-95	91
1995-96	50
1996-97	33
1997-98	49
1998-99	37
1999-00	30
2000-01	22
2001-02	7
2002-03	26
2003-04	33
2004-05	53

PUBLIC RELATIONS COMMITTEE REPORT

We would like to thank the National Peanut Board for their assistance in publizing our joint meeting.

We encouraged our colleagues to attend this meeting and requested they, along with us, distribute press releases in their respective states.

Respectfully submitted by,
Bob Sutter, Chair

PUBLICATIONS AND EDITORIAL COMMITTEE REPORT

The Committee met in the Jefferson Room, Portsmouth Renaissance Hotel, Portsmouth, Virginia, from 12:00 to 12:30 p.m., on July 12, 2005.

The Publications and Editorial Committee received the Editor's report from Dr. Tom Stalker. Highlights of the report are as follows:

- Volume 30, issue no. 1 had 13 manuscripts, was published, and sent to the membership in January 2005. Volume 30, no 2 will have 13 manuscripts and is currently being completed by Pierce Printing and should be sent to the membership within the next 2 weeks. Unacceptable delays caused by this company compelled us to utilize the services of another company for future printing jobs.
- Volume 31, no. 1 was completed by Lang Printing Co., Tifton, GA, and they have been very professional and timely with printing responsibilities. This issue also had 13 manuscripts and was mailed to the membership on July 5, 2005. Although mailings are not in sequence, the decision was made to distribute the journal to avoid additional delays. Thirteen manuscripts were sent to Lang Printing Co. for Volume 31, issue no. 2, and galley proofs should be distributed to authors before the end of July.
- Five manuscripts have been accepted for Volume 32, no. 1, and five additional manuscripts have been received by the editor and their acceptance is pending.
- All Associate Editors will remain in their current position during the coming year except for Mark Black and Kim Moore who have served a total of six years as associate editors.
- Lastly, Dr. Stalker has been serving as Editor of *Peanut Science* since 1994 and resigned from this position on June 30, 2005, because of heavy workload associated with administrative duties at North Carolina State University. He has enjoyed working with the membership during the past 11 years to publish their manuscripts in the journal, and on a larger scale, to

distribute relevant information to the scientific community.

Dr. John Wilcut will be the new Editor of *Peanut Science* effective July 1, 2005.

In other business, and in accordance with the recommendations of the Ad Hoc Committee, the Editorial and Publications Committee discussed making a change to an electronic, on-line manuscript submission format along with electronic publishing of *Peanut Science*. Dr. Wilcut presented recent pricing information for services provided by Allen Press, the publishing division of Alliance Communications. After review, the committee unanimously agreed to recommend to the Board of Directors that electronic submission and publication of *Peanut Science* begin as soon as possible.

Also, in accordance with recommendations of the Ad Hoc Committee, the Editorial and Publications Committee asked Dr. Carroll Johnson to assume leadership of *Peanut Research*, the society's newsletter.

Additional business addressed publication of an educational bulletin that outlines peanut growth and development. Many positive benefits would be recognized by the Society with publishing a document of this type, but given the changes being made to *Peanut Science*, the committee recommended that publication of additional Society sponsored material be addressed at a later date.

No further business was discussed and the committee adjourned.

Respectfully submitted by,
Michael Franke, Chair

PEANUT SCIENCE EDITOR'S REPORT

During the past two years *Peanut Science* received 57 manuscripts, with 31 from July 1, 2003 to June 30, 2004 and 27 from July 1, 2004 to June 30, 2005. The target publication number has been 26 manuscripts per year, which may change as the Society transitions to electronic publishing.

Volume 30, issue no. 1 had 13 manuscripts was published and sent to the membership in January 2005. Volume 30, no. 2 will have 13 manuscripts and is currently being completed by Pierce Printing and should be sent to the membership within the next 2 weeks. Unacceptable delays caused by this company compelled us to utilize the services of another company for future printing jobs.

Volume 31, no 1 (spring, 2004) was completed by Lang Printing Company, Tifton, GA, and they have been very professional and timely with printing responsibilities. This issue also had 13 manuscripts and was mailed to the membership on July 5, 2005. Although mailings are

not in sequence, I made the decision to distribute the journal to avoid additional delays. Thirteen manuscripts were sent to Lang Printing Co. for Volume 31, issue no. 2 (Fall, 2004), and galley proofs should be distributed to authors before the end of July.

Five manuscripts have been accepted for Volume 32, no. 1 (Spring, 2005), and five additional manuscripts have been received by the editor and their acceptance is pending. Last year's budget has been itemized and a proposed budget for the coming year has been completed. Both budgets can be found in the *Proceedings of APRES*.

All of the Associate Editors will remain in the current position during the coming year except for Mark Black and Kim Moore who have served a total of six years as associate editors. Sincere thanks is expressed to Drs. Black and Moore for their service to the journal and to APRES.

Lastly, I have been serving as Editor of Peanut Science since 1994 and resigned from this position on June 30, 2005 because of the heavy workload associated with administrative duties at NC State University. I have enjoyed working with the membership during the past 11 years to publish their manuscripts in the journal, and on a larger scale, to distribute relevant information to the scientific community.

Respectfully submitted by,
H. Thomas Stalker, Editor, Peanut Science

NOMINATING COMMITTEE REPORT

The following nominees were selected prior to the meeting:

President-Elect: Stanley Fletcher, University of Georgia

Board of Directors:
State Employees Representative – Southwest: Todd Baughman, Texas A&M University
Industry Representative – Manufactured Products: Jim Elder, The J.M. Smucker Company

All have agreed to serve if elected at the business meeting.

Respectfully submitted by,
E. Ben Whitty, Chair

FELLOWS COMMITTEE REPORT

Nomination packages were received by March 1 in response to the call for nominations for Fellowship in the American Peanut Research and Education Society. The committee evaluated the nominations according to the guidelines published in the 2004 APRES Proceedings

36:105-108. The committee recommended to the Board of Directors that Dr. Peggy Ozias-Akins and Mr. James Ronald Weeks should be awarded Fellowship at the 2005 Annual Meeting. Committee members participating in the review were Jimmy Ashley, Tim Brenneman, Mark Burrow, Albert Culbreath, Max Grice, and Corley Holbrook.

The fellows committee met at 12:30 p.m. on July 12, 2005 to review work and plan for next year.

Respectfully submitted by,
C. Corley Holbrook, Chair

BIOGRAPHICAL SUMMARIES OF FELLOWS RECIPIENTS

Dr. Peggy Ozias-Akins is a Professor in the Horticulture Department of the University of Georgia at Tifton, Georgia. She has established herself as a world recognized leader in the area of peanut biotechnology and is often sought out as an authority on gene transformation and technologies in peanut.

Dr. Ozias-Akins developed a reproducible system for gene transfer in peanut. The first transgenic peanut plants were produced in her lab using microprojectile bombardment and hygromycin resistance as a selectable marker. Her protocol for gene transfer was published in 1993, has been cited 37 times, and has been adopted by several laboratories around the world. It remains the only reproducible protocol that is applicable to a wide variety of plant cultivars.

Dr. Ozias-Akins is an excellent collaborator, having been involved in numerous projects involving peanut genomics, gene transformation, and germplasm development. Among her most successful accomplishments in peanut research was the transformation of a peanut genotype with the Bt gene. This cooperative project resulted in a peanut that could tolerate feeding by lesser cornstalk borer. Although not in commercial production at this time, the technology is there when necessary to be further developed into a commercial cultivar. She is also a leader in the development of a technique called “TILLING”, a way of genetically modifying peanut through chemical mutagenesis, that is less controversial than the use of GMOs.

Dr. Ozias-Akins has been an active participant in APRES. She has attended most of the meetings over the past 15-20 years, has served on a number of committees and has given numerous presentations. She

served as Associate Editor of *Peanut Science* from 1994-2000. She is an author of 61 refereed journal articles, 13 book chapters, and 2 patents.

Dr. Ozias-Akins is conducting complex long-term research that is addressing key problems which will help to keep the peanut industry viable and profitable in the future. She is addressing high priority research areas such as transferring unique genes to peanut and studying these genes in field grown plants. She is considered the national and international leader in this research. At the same time Dr. Ozias-Akins is effectively communicating the importance of biotechnology in peanut to a broad range of people, from high school students to international scientists.

Mr. James Ronald Weeks is an extension entomologist with Auburn University and is stationed at the Wiregrass Research and Extension Center in Headland, Alabama.

Mr. Weeks has been a faithful member of APRES since 1979, having missed only two annual meetings due to family emergencies. He has presented 17 papers at annual meetings and been a co-author on 24 others. He has served on numerous committees and has served on the Board of Directors. He is an author of nine referred Journal Articles, 60 abstracts, six technical bulletins, and nine extension publications.

His research efforts have contributed to many issues critical to peanut growers in the southeast. Some of these include the development of the Tomato Spotted Wilt Virus Risk Index, development of recommendations for peanut root-knot nematode management, screening of peanut cultivars for virus and disease resistance, programs for suppression of southern stem rot, development of low input management programs, development of IPM control guides, and most recently, evaluation of tillage, row patterns, insecticides and planting dates for impact on TSWV.

Among peanut entomologists, Ron is also known and respected for his many years of work with lesser corn stalk borer, a difficult soil insect pest common to southern peanut growing states. Ron's research, in

cooperation with many other faculty and local growers, resulted in a practical weather-based pest prediction system that greatly improves management options for growers.

Ron has been recognized for his outstanding contributions to the peanut industry both locally and nationally. In 1996, he was presented with the Professional Excellence Award by the Alabama Extension Specialists Association. In short, Mr. Ron Weeks has devoted the majority of his professional career to developing solutions to peanut insect problems that are of significant value to not only Alabama growers, but have also influenced many insect pest management programs across the Peanut Belt.

GUIDELINES for AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY FELLOW ELECTIONS

Fellows

Fellows are active members of the Society who have been nominated to receive the honor of fellowship by other active members, recommended by the Fellows Committee, and elected by the APRES Board of Directors. Up to three active members may be elected to fellowship each year.

Eligibility of Nominators

Nominations may be made by an active member of the Society except members of the Fellows Committee and the APRES Board of Directors. A member may nominate only one person for election to fellowship in any one year.

Eligibility of Nominees

Nominees must be active members of the Society at the time of their nomination and must have been active members for a total of at least five (5) years.

The nominee should have made outstanding contributions in an area of specialization whether in research, extension or administration and whether in public, commercial or private service activities. Members of the Fellows Committee and voting members of the APRES Board of Directors are ineligible for nomination.

Nomination Procedures

Preparation. Careful preparation of the nomination for a distinguished colleague based principally on the candidate's record of service will assure a fair evaluation by a responsible panel. The assistance of the nominee in supplying accurate information is permissible. The documentation should be brief and devoid of repetition. The identification of the nominee's contributions is the most important part of the nomination. The relative weight of the categories of achievement and performance are given in the attached "Format."

Format. Organize the nomination in the order shown in the "Format for Fellow Nominations." The body of the nomination, excluding publications lists and supporting letters, should be no more than eight (8) pages.

Supporting letters. The nomination shall include a minimum of three supporting letters (maximum of five). Two of the three required letters must be from active members of the Society. The letters are solicited by, and are addressed to, the nominator, and should not be dated. Those writing supporting letters need not repeat factual information that will obviously be given by the nominator, but rather

should evaluate the significance of the nominee's achievements. Members of the Fellows Committee, the APRES Board of Directors, and the nominator are not eligible to write supporting letters.

Deadline. Six (6) copies of the nomination are to be received by the chairman of the Fellows Committee by March 1 each year.

Basis of Evaluation

A maximum of 10 points is allotted to the nominee's personal achievements and recognition. A maximum of 50 points is allotted to the nominee's achievements in his or her primary area of activity, i.e. research, extension, service to industry, or administration. A maximum of 10 points is also allotted to the nominee's achievements in secondary areas of activity. A maximum of 30 points is allotted to the nominee's service to the profession.

Processing of Nominations

The Fellows Committee shall evaluate the nominations, assign each nominee a score, and make recommendations regarding approval by April 1. The President of APRES shall mail the committee recommendations to the Board of Directors for election of Fellows, maximum of three (3), for that year. A simple majority of the Board of Directors must vote in favor of a nominee for election to fellowship. Persons elected to fellowship, and their nominators, are to be informed promptly. Unsuccessful nominations shall be returned to the nominators and may be resubmitted the following year.

Recognition

Fellows shall receive a plaque at the annual business meeting of APRES. The Fellows Committee Chairman shall announce the elected Fellows and the President shall present each a certificate. The members elected to fellowship shall be recognized by publishing a brief biographical sketch of each, including a photograph and summary of accomplishments, in the APRES PROCEEDINGS. The brief biographical sketch is to be prepared by the Fellows Committee.

Distribution of Guidelines

These guidelines and the format are to be published in the APRES PROCEEDINGS and again whenever changes are made. Nominations should be solicited by an announcement published in "APRES Peanut Research."

FORMAT for AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY FELLOW NOMINATIONS

TITLE: "Nomination of _____ for Election to Fellowship by the American Peanut Research and Education Society."

NOMINEE: Name, date and place of birth, mailing address, and Telephone number.

NOMINATOR: Name, signature, mailing address, and telephone number.

BASIS OF NOMINATION: Primary area: designate Research, Extension, Service to Industry, or Administration.

Secondary areas: designate contributions In areas other than the nominee's primary area of activity.

QUALIFICATIONS OF NOMINEE: Complete parts I and III for all Candidates and as many of II -A, -B, -C, and -D as are applicable.

I. Personal Achievements And Recognition (10 points)

A. Degrees received: give field, date, and institution for each degree.
B. Membership in professional and honorary academic societies.
C. Honors and awards received since the baccalaureate degree.
D. Employment: years, organizations and locations.

II. Achievement in Primary (50 Points) And Secondary (10 Points) Fields of Activity

A. Research
Significance and originality of basic and applied research contributions; scientific contribution to the peanut industry; evidence of excellence and creative reasoning and skill; number and quality of publications; quality and magnitude of editorial contributions. Attach a chronological list of publications.

B. Extension
Ability to (a) communicate ideas clearly, (b) influence client attitudes, and (c) motivate change in client action. Evaluate the quality, number and effectiveness of publications for the audience intended. Attach a chronological list of publications.

C. Service to Industry
Development or improvement of programs, practices, and products. Evaluate the significance, originality and acceptance by the public.

D. Administration or Business
Evidence of creativeness, relevance, and effectiveness of administration of activities or business within or outside the USA.

III. Service to The Profession (30 Points)

A. Service to APRES including length, quality, and significance of service.
1. List appointed positions.
2. List elected positions.
3. Briefly describe other service to the Society.

B. Service to the profession outside the Society including various administrative skills and public relations actions reflecting favorably upon the profession.

1. Describe advancement in the science, practice and status of peanut research, education or extension, resulting from administrative skill and effort.
2. Describe initiation and execution of public relations activities promoting understanding and use of peanuts, peanut science and technology by various individuals and organized groups within and outside the USA.

EVALUATION: Identify in this section, by brief reference to the appropriate materials in sections II and III, the combination of the contributions on which the nomination is based. Briefly note the relevance of key items explaining why the nominee is especially well qualified for fellowship.

BAILEY AWARD COMMITTEE REPORT

There were 15 qualified nominees for the Bailey Award from the 2004 meeting. Manuscripts were received from six nominees for evaluation for the Bailey Award to be presented at the 2005 meeting. The winning paper was titled “Physiological Behavior of Root-Absorbed Flumioxazin in Peanut, Ivyleaf Morningglory, and Sicklepod”, and was submitted by J.W. Wilcut, A.J. Price, S.B. Clewis, and J.R. Cranmer.

Respectfully submitted by:
Todd Baughman, Chair

GUIDELINES for AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY BAILEY AWARD

The Bailey Award was established in honor of Wallace K. Bailey, an eminent peanut scientist. The award is based on a two-tier system whereby nominations are selected based on the oral paper presentation in sessions at the annual APRES meeting, and final awards are made after critiquing manuscripts based on the information presented during the respective meeting.

For initial selection, the session chairman shall appoint three persons, including him/herself if desired, to select the best paper in the session. None of the judges can be an author or co-author of papers presented during the respective session. No more than one paper from each session can be nominated for the award but, at the discretion of the session chairman in consultation with the Bailey Award chairman, the three-member committee may forego submission of a nomination. Symposia and poster presentations are not eligible for the Bailey Award. The following should be considered for eligibility:

1. The presenter of a nominated paper, whether the first or a secondary author, must be a member of APRES.

2. Graduate students being judged for the Joe Sugg Award are also eligible for the Bailey Award if they meet all other criteria for eligibility.

Oral presentations will be judged for the Award based on the following criteria:

1. Well organized.

2. Clearly stated.

3. Scientifically sound.

4. Original research or new concepts in extension or education.

5. Presented within the time allowed.

A copy of these criteria will be distributed to each session chair and judge prior to the paper session.

Final evaluation for the Award will be made from manuscripts submitted to the Awards Committee, after having been selected previously from presentations at the APRES meetings. These manuscripts should be based on the oral presentation and abstract as published in the PROCEEDINGS.

Authorship of the manuscript should be the same (both in name and order) as the original abstract. Papers with added author(s) will be ruled ineligible. Manuscripts are judged using the following criteria:

1. Appropriateness of the introduction, materials and methods, results and discussion, interpretation and conclusions, illustrations and tables.

2. Originality of concept and methodology.

3. Clarity of text, tables and figures; economy of style; building on known literature.

4. Contribution to peanut scientific knowledge.

The Bailey Award chair for the current year's meeting will complete the following:

a) notify session moderators for the upcoming meeting of their responsibilities in relation to judging oral presentations as set in the guidelines in APRES PROCEEDINGS,
b) meet with committee at APRES meeting,
c) collect names of nominees from session moderators by Friday a.m. of Annual Meeting,
d) provide Executive Officer and Bailey Award committee members the name of Bailey Award nominees,
e) notify nominees within two months of meeting,
f) set deadline in late Fall or early winter for receipt of manuscripts by Bailey Award chair,
g) distribute manuscripts to committee members,
h) provide Executive Officer with Bailey Award winner and paper title no later than May 15, and
i) Bailey Award chair's responsibilities are completed when the Executive Officer receives Bailey Award recipient's name and paper title.

The presentation of bookends will be made to the speaker and other authors appropriately recognized.

JOE SUGG GRADUATE STUDENT AWARD REPORT

The committee met Tuesday, July 12th in the Washington Room from 12:00 to 12:30 p.m. Prior to the meeting a copy of the judging criteria was sent to all committee members and a copy was sent to all students who entered the session. Papers selected for the 2005 Joe Sugg Graduate Student Award:

1st Place – paper #28; D.L. Smith et al – "Evaluation of Alternating Application and Protective Properties of the Fungicides Fluazinam and Boscalid for Control of Sclerotinia Blight in North Carolina".

2nd Place – paper #26; S.K. Gremillion et al – "Durability of Resistance in Advanced Peanut Breeding Lines to Leaf Spot and Tomato Spotted Wilt".

Respectfully submitted by,
Bob Kemerait, Chair

COYT T. WILSON DISTINGUISHED SERVICE AWARD REPORT

The Coyt T. Wilson Distinguished Service Award Committee meeting was held in the Lee Room of the Renaissance Hotel in Portsmouth, Virginia, at 12:00 Noon on Tuesday, July 12, 2005. The committee confirmed the selection of Dr. Thomas B. Whitaker as the 2005 recipient of the award. The committee discussed ways to encourage members to nominate qualified people to receive the award in the future. The chair of the committee wishes to thank Dr. John Damicone for agreeing to handle late nominations since the chair was out of the country during the extended deadline period.

Coyt T. Wilson Distinguished Service Award Committee:
Charles Simpson, Chair (2005)
Pat Phipps (2005)
John Damicone (2006)
David Jordan (2006)
Eric Prostko (2007)
Wilson Faircloth (2007)

Respectfully submitted by,
Charles Simpson, Chair

BIOGRAPHICAL SUMMARY OF COYT T. WILSON DISTINGUISHED SERVICE AWARD RECIPIENT

Dr. Thomas B. Whitaker was born in Asheville, North Carolina May 16, 1939. He received a BS in Agricultural Engineering from NC State University in 1962 and an MS from the same department in 1964. In 1967 he earned a PhD in Agricultural Engineering from Ohio State University. Dr. Whitaker has worked for the USDA-ARS-SAA Market Quality and Handling Research Unit at North Carolina State University from 1967 to the present. He has attended 30 annual meetings of APREA and APRES during his 37 years of membership.

In his many areas of service to the Society, Dr. Whitaker has served on fifteen different appointed and elected positions and committees, and on five of those more than once, two of them three times. He served as chair of six different committees, including Peanut Quality, Sampling Sub-Committee, Golden Peanut Award Advisory Committee, Publications and Editorial Committee, Ad Hoc Committee (New Book 1991-'92), Bailey Award Committee, and he served as chair of the Sampling Sub-Committee a second time, as well.

Dr. Whitaker has served as USDA representative to the APRES Board of Directors and he has served two terms as an Associate Editor of Peanut Science. An area of major contribution also includes his significant involvement in the books *Peanut Science and Technology* and *Advances in Peanut Science*.

Previous recognition of Dr. Whitaker by the Society include the APRES Bailey Award in 1976 and again in 1992; he received the American Peanut Council Golden Peanut Award in 1980, and the same award under the new name American Peanut Council Research and Education Award in 2002; he received the APRES Dow AgroSciences Award for excellence in Research in 1998; and he received the Society's highest award in 1996 when he was named a Fellow of APRES.

In addition to his distinguished service to the Society, Dr. Whitaker has made meritorious contribution to the peanut industry in the area of sampling for aflatoxin and for grading, including handling for moisture content. This area of research has brought international recognition to Dr. Whitaker, as evidenced by his appointment in 2000, as a member of the Joint Expert Committee on Food Additive (JECFA) to determine human risks to five mycotoxins in food products, a joint committee of the Food and Agriculture Organization, World Health Organization, and the United Nations. Dr. Whitaker had previously served as a consultant to the FAO-WHO Expert Consultation on Sampling Corn and Peanuts for Aflatoxin, a group of the Food and Agriculture Organization of the United Nations (1993).

Dr. Whitaker has also received at least twelve other recognitions or awards from the USDA and other honor and international organizations. From these items listed above and his service to APRES, it is clear that Dr. Thomas B. Whitaker is well deserving of the Coyt T. Wilson Distinguished Service Award from APRES for 2005.

GUIDELINES for AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY COYT T. WILSON DISTINGUISHED SERVICE AWARD

The Coyt T. Wilson Distinguished Service Award will recognize an individual who has contributed two or more years of distinguished service to the American Peanut Research and Education Society. It will be given annually in honor of Dr. Coyt T. Wilson who contributed freely of his time and service to this organization in its formative years. He was a leader and advisor until his retirement in 1976.

Eligibility of Nominators

Nominations may be made by an active member of the Society except members of the Award Committee and the Board of Directors. However, the nomination must be endorsed by a member of the Board of Directors. A nominator may make only one nomination each year and a member of the Board of Directors may endorse only one nomination each year.

Eligibility of Nominees

Nominees must be active members of the Society and must have been active for at least five years. The nominee must have given of their time freely and contributed distinguished service for two or more years to the Society in the area of committee appointments, officer duties, editorial boards, or special assignments. Members of the Award Committee are ineligible for nomination.

Nomination Procedures

Deadline. The deadline date for receipt of the nominations by the chairman shall be March 1 of each year.

Preparation. Careful preparation of the nomination based on the candidate's service to the Society is critical. The nominee may assist in order to assure the accuracy of the information needed. The documentation should be brief and devoid of repetition. Six copies of the nomination packet should be sent to the committee chair.

Format. TITLE: Entitle the document "Nomination of _____ for the Coyt T. Wilson Distinguished Service Award presented by the American Peanut Research and Education Society". (Insert the name of the nominee in the blank).

NOMINEE: Include the name, date and place of birth, mail address (with zip code) and telephone number (with area code).

NOMINATOR AND ENDORSER: Include the typewritten names, signatures, mail addresses (with zip codes) and telephone numbers (with area codes).

SERVICE AREA: Designate area as Committee

Appointments, Officer Duties, Editorial Boards, or Special Assignments. (List in chronological order by year of appointment.)

Qualifications of Nominee

I. Personal Achievements and Recognition:
   A. Education and degrees received: Give field, date and institution.
   B. Membership in professional organizations
   C. Honors and awards
   D. Employment: Give years, locations and organizations

II. Service to the Society:
   A. Number of years membership in APRES
   B. Number of APRES annual meetings attended
   C. List all appointed or elected positions held
   D. Basis for nomination
   E. Significance of service including changes which took place in the Society as a result of this work and date it occurred.

III. Supporting letters:
   Two supporting letters should be included with the nomination. These letters should be from Society members who worked with the nominee in the service rendered to the Society or is familiar with this service. The letters are solicited by and are addressed to the nominator. Members of the Award Committee and the nominator are not eligible to write supporting letters.

Award and Presentation

The award shall consist of a $1,000 cash award and a bronze and wood plaque both provided by the Society and presented at the annual meeting.

DOW AGROSCIENCES AWARDS COMMITTEE REPORT

The committee's selection was made before the annual meeting by telephone and e-mail. Consequently no formal meeting was held during the annual meeting and no report was made at the Friday morning breakfast.

Respectfully submitted by,
Chip Lee, Member of the Dow AgroSciences Awards Committee

BIOGRAPHICAL SUMMARY OF DOW AGROSCIENCES AWARD FOR EXCELLENCE IN RESEARCH RECIPIENT

Dr. Bill Branch is the peanut breeder for the Georgia Peanut Breeding Program and is a Professor in the Crop and Soil Science Department at the University of Georgia. He has been actively involved in APRES and is known throughout the world for the development of improved cultivars with desirable traits for increasing dollar value, yield, grade, disease resistance, insect resistance, virus resistance, nematode resistance, aflatoxin resistance, drought tolerance, better shelling characteristics, longer shelf-life, and enhanced flavor and nutritional qualities. Dr. Branch has released five peanut genetic stocks, five peanut germplasm or parental lines, and 11 peanut cultivars.

In 1995, Dr. Branch released the high-yielding, TSWV-resistant, runner-type peanut cultivar "Georgia Green". Since then, Georgia Green has been the peanut farmer's major defense against the devastating TSWV. During these adverse years of combined stress and disease problems, Georgia Green helped to save the southeastern United States peanut industry.

Dr. Branch has been recognized numerous times by various organizations for his excellent work in peanut breeding. His contributions to APRES, Agri-Industry, and producers throughout the U.S. have been numerous and of the highest quality.

BIOGRAPHICAL SUMMARY OF DOW AGROSCIENCES AWARD FOR EXCELLENCE IN EDUCATION RECIPIENT

Dr. Eric Prostko is an Extension Agronomist – Weed Science with the University of Georgia. Within the scope of his assignment, Dr. Prostko has several outstanding accomplishments with highly significant impact. He has developed and maintained some of the most technologically advanced extension weed science programs in the southeastern U.S. While at Texas A&M University, Dr. Prostko developed web sites for

ready access to updated weed science information. He continued that facet of his program at the University of Georgia by developing a similar site; http://gaweed.com. A unique attribute of these sites is the availability of publications and slide presentations that can be easily downloaded. Dr. Prostko's vision and innovations were recognized by the American Society of Agronomy honoring him with a Certificate of Excellence in the Educational Materials Award Contest – Internet Web Sites Category.

Dr. Prostko was the leader in developing the comprehensive color pictorial publication "Peanut Herbicide Injury Symptomology Guide", available from Texas A&M University. Until this publication was developed, one devoted exclusively to peanut did not exist.

A key component of Dr. Prostko's extension program is to actively train county agents using quality scientific data. He has been with the University of Georgia since August 1999 and since then has conducted 31 in-service training sessions for Georgia and Florida county agents. Dr. Prostko's county agent training sessions are informative, based on up-to-date research, and very practical.

Dr. Prostko is skilled in traditional Extension methods of education. Since 1997, he has made 256 presentations to 12,578 growers at county production meetings. He is a regular contributor to the traditional periodicals "Southeastern Farm Press" and "Peanut Farmer".

Dr. Prostko has an strong and consistent publication record. He has 26 referred journal articles, 87 abstracts/proceedings, 34 bulletins, 156 popular press articles/newsletters, and 20 assorted publications. Dr. Prostko is a very productive and efficient writer, fully capable of quality publications written to a variety of audiences using sound weed science data.

Dr. Prostko has a very effective extension weed science program and is highly regarded by his peers. In recognition of his accomplishments as an Extension Agronomist, Dr. Prostko has received two awards; the Southern Weed Science Outstanding Young Weed Scientist Award (2005) and the Michael J. Bader Award of Excellence for Junior Scientist – Extension (2004). These awards show the impact of Dr. Prostko's programs and acknowledge the respect he has earned from his peers. He is much deserving of this award.

GUIDELINES for DOW AGROSCIENCES AWARDS FOR EXCELLENCE IN RESEARCH AND EDUCATION

I. Dow AgroSciences Award for Excellence in Research

The award will recognize an individual or team for excellence in research. The award may recognize an individual (team) for career performance or for an outstanding current research achievement of significant benefit to the peanut industry. One award will be given each year provided worthy nominees are nominated. The recipient will receive an appropriately engraved plaque and a $1,000 cash award. In the event of team winners, one plaque will be presented to the team leader and other team members will receive framed certificates. The cash award will be divided equally among team members.

Eligibility of Nominees

Nominees must be active members of the American Peanut Research and Education Society and must have been active members for the past five years. The nominee or team must have made outstanding contributions to the peanut industry through research projects. Members of the Dow AgroSciences Awards Committee are ineligible for the award while serving on the committee.

II. Dow AgroSciences Award for Excellence in Education

The award will recognize an individual or team for excellence in educational programs. The award may recognize an individual (team) for career performance or for an outstanding current educational achievement of significant benefit to the peanut industry. One award will be given each year provided worthy nominees are nominated. The recipient will receive an appropriately engraved plaque and a $1,000 cash award. In the event of team winners, one plaque will be presented to the team leader and other team members will receive framed certificates. The cash award will be divided equally among team members.

Eligibility of Nominees

Nominees must be active members of the American Peanut Research and Education Society and must have been active members for the past five years. The nominee or team must have made outstanding contributions to the peanut industry through education programs. Members of the Dow AgroSciences Awards Committee are not eligible for the award while serving on the committee.

Eligibility of nominators, nomination procedures, and the Dow AgroSciences Awards Committee are identical for the two awards and are described below:

Eligibility of Nominators

Nominators must be active members of the American Peanut Research and Education Society. Members of the Dow AgroSciences Awards Committee are not eligible to make nominations while serving on the committee. A nominator may make only one nomination each year.

Nomination Procedures

Nominations will be made on the Nomination Form for Dow AgroSciences Awards. Forms are available from the Executive Officer of APRES. A nominator's submittal letter summarizing the significant professional achievements and their impact on the peanut industry must be submitted with the nomination. Three supporting letters must be submitted with the nomination. Supporting letters may be no more than one page in length. Nominations must be postmarked no later than March 1 and mailed to the committee chair.

Dow AgroSciences Awards Committee

The APRES President is responsible for appointing the committee. The committee will consist of seven members with one member representing the sponsor. After the initial appointments, the President will appoint two new members each year to serve a term of three years. If a sponsor representative serves on the awards committee, the sponsor representative will not be eligible to serve as chair of the committee.

NOMINATION FORM FOR DOW AGROSCIENCES AWARDS

General Instructions: Listed below is the information to be included in the nomination for individuals or teams for the Dow AgroSciences Award. Ensure that all information is included. Complete Section VI, Professional Achievements, on the back of this form. Attach additional sheets as required.

****

Indicate the award for which this nomination is being submitted.
Date nomination submitted:

___ Dow AgroSciences Award for Excellence in Education

___ Dow AgroSciences Award for Excellence in Research

****

I. Nominee(s): For a team nomination, list the requested information on all team members on a separate sheet.

Nominee(s): _____

Address _____

Title _____ Tel No. _____

II. Nominator:

Name _____ Signature_____

Address _____

Title _____Tel No._____

III. Education: (include schools, college, universities, dates attended and degrees granted).

IV. Career: (state the positions held by listing present position first, titles, places of employment and dates of employment).

V. Honors and Awards: (received during professional career).

VI. Professional Achievements: (Describe achievement in which the nominee has made significant contributions to the peanut industry).

VII. Significance: (A "tight" summary and evaluation of the nominee's most significant contributions and their impact on the peanut industry.) This material should be suitable for a news release.

PEANUT QUALITY COMMITTEE REPORT

No report given.

Victor Nwosu, Chair

PROGRAM COMMITTEE REPORT

The local arrangements committee consisting of Fred Shokes, Dennis Coker and Pat Phipps met several times with staff of the National Peanut Board (NPB) in 2004 and early 2005 to discuss prospects for a joint meeting of APRES and NPB. Subsequently, a proposal for holding the joint meeting in 2005 was proposed and approved by the APRES Board of Directors. Members of the APRES program committee (Fred Shokes, Dennis Coker, Fred Garner, Dell Cotton) worked cooperatively with staff of the NPB (Raffaela Marie Fenn, Chris Destino, Steve O'Brien, DeMarquiné Houston) to secure an excellent meeting site and industry-sponsored events for the 2005 joint meeting. Other contributors included Richard Rudolph of Bayer CropScience, Scott Asher of BASF, and Ken Teeter of Syngenta Crop Protection whose companies sponsored major functions during the APRES meeting. Ames Herbert, Joel Faircloth, Sean Malone and Gail White deserve special recognition for organizing and preparing the technical program. The APRES Executive Officer, Ron Sholar, and office administrator, Irene Nickels, provided invaluable assistance and guidance in making the APRES meeting a complete success.

Equally deserving of special recognition were the staff of NPB and Dee Dee Darden, the Virginia member of NPB. In addition to bringing the NPB Mobile Marketing Unit to the Portsmouth Waterfront, the NPB held their annual Growers Summit followed by a Pig Picking, which attracted a full audience of growers, industry workers, university research and extension employees, and representatives of several government agencies.

The General Session of the meeting was a major attraction for members of APRES and NPB, industry workers, and growers. Each speaker presented his or her "*Visions into the Future of Agriculture and our Peanut Industry*". Speakers included Carlton Courter – Virginia Commissioner of Agriculture, Floyd Gaibler - U.S. Under Secretary of Agriculture for Foreign Trade and Farm Programs, Jeff Johnson - President of Birdsong Peanuts, and Dee Dee Darden - Virginia Peanut Grower and member of NPB.

Additional meetings included the annual meeting of the Virginia Peanut Growers Association under the leadership of Tommy Rountree, President, and Dell Cotton, Executive officer, and a meeting of the Board of Directors of the North Carolina Peanut Growers Association under the leadership of Donnie White, President, and Bob Sutter, Executive Officer.

There were 93 papers and 26 posters presented in the APRES program. The APRES meeting registration totaled 388, which included 231 members and 157 spouses and children. Registrations for the NPB Grower Summit include up to 60 including Board Members and staff, and a projected number of up to 80 non-registered growers.

Respectively submitted by:
Patrick Phipps, Chair

2005 PROGRAM
Fifth Annual Grower Summit
National Peanut Board

Portsmouth, Virginia
July 11-13, 2005

NATIONAL PEANUT BOARD

Donnie White, Chairman ..... North Carolina
Larry Ford, Vice-Chairman ..... Florida
Roger Neitsch, Treasurer ..... Texas
Richard Robbins, Secretary ..... New Mexico
Ben Bowden ..... Alabama
Wes Shannon ..... Georgia
John Clay ..... Oklahoma
Bob Scott ..... South Carolina
Dee Dee Darden ..... Virginia

STAFF

Raffaela Marie Fenn ..... President and Managing Director
Chris Destino ..... Operations and Events Manager
Steve O'Brien ..... Grower Communications Manager
DeMarquiné Houston ..... Office Administrator

LOCAL ARRANGEMENTS

DeMarquiné Houston Dee Dee Darden

CONTRIBUTORS TO 2005 NPB GROWER SUMMIT

The NPB wishes to express their gratitude to the following companies for contributions in support of this meeting:

Anderson's Peanuts
Atlanta Braves
Birdsong Peanuts
Busch Entertainment Corporation
Cooking Light Magazine
The Culinary Institute of America
Culinology
Everyday Food
Fine Living Network
Flavor and the Menu Magazine
Food Arts Magazine
Food Network/Scripps Network
Golden Peanut Company
Jimbo's Jumbos
KMC
McClesky Mills
O (Oprah Magazine)
People Magazine
The Clint Williams Company
Sunland Peanut Co.

Thirty-Seventh Annual Meeting American Peanut Research and Education Society

Portsmouth, Virginia
July 12-15, 2005

BOARD OF DIRECTORS

President ..... James Grichar
Past President ..... E. Ben Whitty
President-Elect ..... Patrick M. Phipps
Executive Officer ..... J. Ronald Sholar
State Employee Representatives:
Virginia-Carolina ..... Barbara Shew
Southeast ..... E. Jay Williams
Southwest ..... Kenton Dashiell
USDA Representative ..... Ron Sorensen
Industry Representatives:
Production ..... Michael Franke
Shelling, Marketing, Storage ..... Fred Garner
Manufactured Products ..... Richard Rudolph
American Peanut Council ..... Howard Valentine

PROGRAM COMMITTEE

Patrick M. Phipps, Chair

Local Arrangements

Fred Shokes, Co-Chair
Dennis Coker, Co-Chair
Richard Rudolph
Fred Garner
Dell Cotton
Ken Teeter

Technical Program

Ames Herbert, Co-chair
Joel Faircloth, Co-Chair
Sean Malone
Gail White

Spouses Program

Pat Shokes
Fred Garner
Carla Faye Coker
Janet Phipps
LeAnn Alexander
Christine Faircloth

Abstract Reviewers

Dennis Coker
Joel Faircloth
Ames Herbert
Sean Malone
Jim Pease
Pat Phipps
Tim Sanders
Fred Shokes

Contributors to 2005 APRES Meeting

On behalf of APRES members and guests,
the Program Committee says **"THANK YOU"** to the following
organizations for their generous financial and product contributions:

SPECIAL ACTIVITIES

Wednesday's Reception/Dinner – Bayer CropScience and BASF
Thursday's Ice Cream Social – *(see below)*
Friday's Awards Breakfast – Dow AgroSciences
Spouses' Hospitality Program – Virginia Farm Bureau Federation
Daily Breaks – Syngenta Crop Protection

Ice Cream Social and Breaks

AMVAC Chemical Corporation
Becker Underwood
Birdsong Peanuts
Chem Nut Inc.
DuPont Crop Protection
Farm Press Publications
Golden Peanut Co., LLC
Gowan Company
Hampton Farms
Helena Chemical Company
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Severn Peanut Co., LLC
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Southern Peanut Co., Inc.
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Vicam

Product Contributors

Alabama Peanut Producers Association
Florida Peanut Producers Association
Georgia Peanut Commission
The Hershey Company
Kraft Foods
Masterfoods USA
Nestle USA
North Carolina Peanut Growers Association
Oklahoma Peanut Commission
South Carolina Peanut Board
Texas Peanut Producers Board
Virginia Peanut Growers Association
Western Peanut Growers Association, Inc.

APRES COMMITTEE MEETINGS (*Tuesday, July 12*)

Peanut Quality
(11:00 am – Case Amphitheater)
Victor Nwosu (2005), Chair
Jim Cary (2005), Tim Sanders (2005)
Emory Murphy (2005), Margaret Hinds (2005)
Carolyn Bednar (2006), Justin Tuggle (2007)
Howard Valentine (2007)

Finance
(*11:00 am – Lee*)
John Beasley (2005), Chair
Fred Shokes (2005), John Altom (2006)
Richard Rudolph (2006), Hassan Melouk (2007)
Carroll Johnson (2007), Ron Sholar, ex-officio

Publications & Editorial
(*12:00 pm – Jefferson*)
Michael Franke (2005), Chair
Tom Whitaker (2005), Chris Butts (2006)
Marie Fenn (2006), Steve Brown (2007)
Calvin Trostle (2007)

Bailey Award
(*12:00 pm – Monroe*)
Todd Baughman (2007), Chair
Ames Herbert (2005), Nathan Smith (2006)
Jay Williams (2006), Mark Black (2007)
Joel Faircloth (2007)

Coyt T. Wilson
Distinguished Service Award
(*12:00 pm – Lee*)
Charles Simpson (2005), Chair
Pat Phipps (2005), John Damicone (2006)
David Jordan (2006), Eric Prostko (2007)
Wilson Faircloth (2007)

Joe Sugg Graduate
Student Award
(*12:00 pm – Washington*)
Bob Kemerait (2007), Chair
Kelly Chenault (2006), Austin Hagan (2006)
Tom Isleib (2006), Yolanda Lopez (2007)

Dow AgroSciences Awards
(*12:30 pm – Washington*)
John Baldwin (2007), Chair
Max Grice (2005), Jimmy Ashley (2005)
Rick Brandenburg (2005), Chip Lee (2005)
Roy Pittman (2006), Jim Starr (2007)
Randy Huckaba (2007)

Fellows
(12:30 pm – Jefferson)
Corley Holbrook (2005), Chair
Tim Brenneman (2006), Albert Culbreath (2007)
Mark Burow (2007)

Public Relations
(*12:30 pm – Lee*)
Bob Sutter (2005), Chair
Dan Gorbet (2005), Brent Besler (2005)
Ken Barton (2005), Brian Anthony (2006)
Kevin Calhoun (2006), Joe Dorner (2006)

Site Selection
(*12:30 pm – Madison*)
Fred Shokes (2005), Chair
Pat Phipps (2005), Bob Kemerait (2006)
Diane Rowland (2006), Kira Bowen (2007)
Austin Hagan (2007), Peter Dotray (2007)

Nominating
(*12:30 pm – Monroe*)
Ben Whitty (2005), Chair
Jim Todd (2005), Mac Birdsong (2005)
Michael Baring (2005)

Program Highlights

Monday, July 11

8:00 - 4:00 Information desk open ..... 2nd floor hallway
9:00 - 4:00 NPB Mobile Marketing Unit open ..... Waterfront Park
9:00 - 12:00 NPB Committee Meetings ..... Portsmouth Ballroom VI & VII
2:00 - 6:00 APRES Crops Germplasm Committee ..... Jefferson Room

Tuesday, July 12

8:00 -11:00 APRES Peanut Seed Summit ..... Case Study Amphitheater
8:00 -10:00 Spouses' Hospitality Room ..... Cavendish Suite 715
9:00 - 4:00 Information/Registration desk open ..... Registration Area 2nd floor
10:30-11:30 NCPGA Board Meeting ..... Madison Room
11:00-12:00 APRES Peanut Quality Committee ..... Case Study Amphitheater
11:00-12:00 APRES Finance Committee ..... Lee Room
11:30-12:30 VC Promotions Board Meeting ..... Madison Room

12:00 - 1:00 Lunch on your own

12:00-12:30 Publications and Editorial Committee ..... Jefferson Room
12:00-12:30 Joe Sugg Graduate Student Award Committee ..... Washington Room
12:00-12:30 Bailey Award Committee ..... Monroe Room
12:00-12:30 Coyt T. Wilson Distinguished Service Award Committee ..... Lee Room
12:30- 1:00 Dow AgroSciences Awards Committee ..... Washington Room
12:30- 1:00 Site Selection Committee ..... Madison Room
12:30- 1:00 Nominating Committee ..... Monroe Room
12:30- 1:00 Fellows Committee ..... Jefferson Room
12:30- 1:00 Public Relations Committee ..... Lee Room
1:00 - 6:00 Presentation loading (Wednesday's sessions) ..... Washington Room
1:00 - 6:00 Press Room ..... Jefferson Room
1:00 - 6:00 Informal Meeting Room ..... Madison Room
2:00 - 4:00 Spouses' Hospitality Room ..... Cavendish Suite 715

1:30 - 5:30 NPB Annual Growers Summit ..... Portsmouth Ballroom IV-V

3:15 - 3:30 Break Portsmouth Ballroom IV-V

4:00 - 6:00 Exhibitor/Poster setup (Wednesday's session) ..... Holley Ballroom V-VII
5:30 - 6:30 VPGA Annual Meeting ..... Case Study Amphitheater

6:00 - 8:00 NPB/APRES Pig Picking ..... Waterfront Park

7:00 - 10:00 APRES Board of Directors Meeting ..... Commodore Room

Program Highlights

Wednesday, July 13

8:00 - 4:00 Information / Registration desk open ..... Registration Area 2nd floor
8:00 - 5:00 Press Room ..... Jefferson Room
8:00 - 5:00 Informal Meeting Room.....Madison Room
8:00 - 9:30 APRES General Session ..... Portsmouth Ballroom V-VIII
8:00 - 10:00 Spouses' Hospitality Room .....Cavendish Suite 715
9:30 - 4:00 NPB Mobile Marketing Unit open .....Waterfront Park

9:30 - 10:00 Break .....Holley Ballroom V-VII

9:30 - 3:30 Poster Session I (displayed) .....Holley Ballroom V-VII
10:00-12:00 Poster Session I (with authors present) .....Holley Ballroom V-VII
10:00-11:45 Production Technology ..... Holley Ballroom I-III
10:00-11:45 Breeding, Biotechnology, and Genetics I ..... Case Study Amphitheater
10:00-12:00 Plant Pathology and Nematology I..... Holley Ballroom IV

12:00 - 1:15 Lunch on your own

1:15 - 3:00 Graduate Student Competition..... Holley Ballroom IV
2:00 - 4:00 Spouses' Hospitality Room .....Cavendish Suite 715

3:00 - 3:15 Break.....Holley Ballroom V-VII

3:15 - 5:00 Processing and Utilization/Harvesting, Curing, Shelling, Storing, and Handling..... Holley Ballroom I-III
3:15 - 5:00 Economics I ..... Holley Ballroom IV
3:15 - 5:00 Breeding, Biotechnology, and Genetics II ..... Case Study Amphitheater
3:00 - 6:00 Presentation loading (for Thursday's sessions) ..... Washington Room
4:00 - 6:00 Poster setup (for Thursday's session).....Holley Ballroom V-VII

6:00 - 9:00 Dinner .....Portsmouth Ballroom I-IV
Bayer CropScience & BASF

Program Highlights

Thursday, July 14

8:00 - 12:00	Information / Registration desk open	Registration Area 2nd floor
8:00 - 5:00	Press Room	Jefferson Room
8:00 - 5:00	Informal Meeting Room	Madison Room
8:00 - 10:00	Spouses' Hospitality Room	Cavendish Suite 715
8:00 - 10:15	Plant Pathology and Nematology II	Holley Ballroom IV
8:00 - 10:00	Weed Science	Holley Ballroom I-III
8:00 - 10:15	Extension Techniques and Technology / Education for Excellence	Case Study Amphitheater
10:15-10:30	**Break**	**Holley Ballroom V-VII**
10:00 - 2:30	Poster Session II (displayed)	Holley Ballroom V-VII
10:30-12:00	Poster Session II (with authors present)	Holley Ballroom V-VII
10:30-12:00	Breeding, Biotechnology, and Genetics III	Case Study Amphitheater
10:30-11:45	Economics II	Holley Ballroom IV
10:30-11:45	Mycotoxins / Physiology and Seed Technology	Holley Ballroom I-III
12:00 - 1:30	**Lunch on your own**	
1:30 - 2:15	Entomology	Holley Ballroom I-III
2:15 - 2:30	**Break**	**Holley Ballroom V-VII**
2:30 - 4:00	Workshop "Striving for Excellence in Peanut Science"	Holley Ballroom IV
4:00 - 6:30	**Dinner on your own**	
6:30 - 8:00	**Ice Cream Social**	**Portsmouth Ballroom V-VIII & Terrace**

Friday, July 15

7:00-10:00	**Dow AgroSciences Awards Program**	**Portsmouth Ballroom V-VIII**
7:00 - 8:00	Awards Breakfast	
8:00 - 9:00	Awards Ceremony	
9:00-10:00	Business Meeting	
10:00-12:00	Peanut CRSP Project Meeting	Madison Room

National Peanut Board Growers Summit

TUESDAY AFTERNOON (1:30 pm – 5:30 pm)

Holley Ballroom IV-V

1:30 - 1:45 Welcome and Opening comments ..... **Donnie White**
NPB Chairman
James Grichar
APRES President

1:45 - 2:15 NPB's Year in Review

2:15 - 2:45 NBP Strategic Plan roll out

2:45 - 3:15 *"Have we gone totally nuts?"* ..... **Steve Schimoler**
General Manager Culinary Business Development, Sysco Corporation.
Immediate Past President of the Research Chefs Association

3:15 - 3:30 Break ..... Portsmouth Ballroom IV-V

3:30 - 4:30 Research Summary Panel

4:30 - 5:15 Industry-wide Research discussion forum

5:15 - 5:30 Closing comments and wrap-up

WEDNESDAY MORNING (8:00 am – 9:30 am)

Portsmouth Ballroom V-VIII

The General Session will address *"Visions into the Future of Agriculture and our Peanut Industry."*

8:00 - 8:10 Call to Order.....**James Grichar**
APRES President
Donnie White
NPB Chairman

8:10 - 8:20 Welcome to Virginia.....**Carlton Courter**
Virginia Commissioner of Agriculture

8:20 - 8:45 Keynote Speaker .....**Floyd Gaibler**
U.S. Under Secretary of Agriculture
For Foreign Trade and Farm Programs

8:45 - 9:05 Industry Viewpoint.....**Jeff Johnson**
President, Birdsong Peanuts

9:05 - 9:20 A Grower's Perspective .....**DeeDee Darden**
National Peanut Board

9:20 - 9:25 NPB George Washington Carver Award Presentation.....**Wes Shannon**
National Peanut Board

9:25 - 9:30 Announcements.....**Pat Phipps**
APRES President-Elect / Program Chair

WEDNESDAY MORNING (10:00 am – 12:00 pm)

PRODUCTION TECHNOLOGY

Holley Ballroom I-III

Moderator: Harold Pattee, USDA-ARS, North Carolina State University, Raleigh, NC

10:00 (1) Impact of Planting Date on Production of Three Recently Released Virginia-type Peanut Cultivars. J. FAIRCLOTH*, Tidewater AREC, Virginia Tech, Suffolk, VA 23437; D. JORDAN, Department of Crop Science, North Carolina State University, Raleigh, NC, 27695; P. PHIPPS, Tidewater AREC, Virginia Tech, Suffolk, VA 23437; and D.

COKER, Tidewater AREC, Virginia Tech, Suffolk, VA 23437.

10:15 (2) Peanut Yield Response to Reduced Supplemental Irrigation Capacity on Three Tillage Systems in the Southeastern Coastal Plain. W.H. FAIRCLOTH*, M.C. LAMB, D.L. ROWLAND, and R.C. NUTI. USDA/ARS, National Peanut Research Laboratory, Dawson, GA 39842.

10:30 (3) WITHDRAWN

10:45 (4) Conservation Tillage, Winter Cover Crop, Peanut Variety, and Fungicide Rate on Peanut Yield. R.B. SORENSEN*, USDA-ARS-National Peanut Research Laboratory, PO Box 509, 1011 Forrester Dr. SE, Dawson, GA 39842; T.B. BRENNEMAN, University of Georgia, Dept. of Plant Pathology, P.O. Box 748, Tifton GA; M.C. LAMB, USDA-ARS, National Peanut Research Laboratory, PO Box 509, 1011 Forrester Dr. SE, Dawson, GA 39842.

11:00 (5) The Effect of Planting Pattern and Disease Management on Peanut Yield and Grade. R.C. NUTI*, W.H. FAIRCLOTH, C.T. BENNETT, J. DAVIDSON, USDA-ARS, National Peanut Research Laboratory, Dawson, GA 39842; and T.B. BRENNEMAN, University of Georgia, Tifton, GA 31793.

11:15 (6) WITHDRAWN

11:30 (7) Effect of Calcium Products on Virginia Peanut in Texas. T.A. BAUGHMAN*, W.J. GRICHAR, J.C. REED, JR., and W.G. CARTER, III. Texas A&M Research & Extension Center, Vernon and Beeville, TX.

BREEDING, BIOTECHNOLOGY, AND GENETICS I: DISEASE RESISTANCE

Case Study Amphitheater

Moderator: Corley Holbrook, USDA-ARS, Coastal Plain Experiment Station, Tifton, GA

10:00 (8) Comparison of Agronomic Traits and Disease Reactions Between High-Oleic Backcross-Derived Lines and Their Normal-Oleic Recurrent Parents. T.G. ISLEIB*, S.R. MILLA, S.C. COPELAND, and J.B. GRAEBER. Dept. of Crop Science, Box 7629, N.C. State Univ., Raleigh, NC 27695.

10:15 (9) Identification of a Simple Sequence Repeat (SSR) Marker in Cultivated Peanut (*Arachis hypogaea* L.) Potentially Associated with Sclerotinia Blight Resistance. K.D. CHENAULT*, USDA-ARS,

Stillwater, OK 74075; and A. MAAS, Department of Plant and Soil Sciences, Oklahoma State University, Stillwater, OK 74078.

10:30 (10) Marker-Assisted Selection for Nematode Resistance. Y. CHU, P. OZIAS-AKINS*, Department of Horticulture, The University of Georgia Tifton Campus, Tifton, GA 31793; C.C. HOLBROOK, P. TIMPER, USDA-ARS, Coastal Plain Experiment Station, Tifton, GA 31793.

10:45 (11) Relationship of Resistance to Tomato Spotted Wilt to Yield and Grade Factors. D.W. GORBET*, B.L. TILLMAN, University of Florida, NFREC, Marianna, FL 32446, A.K. CULBREATH, J.W. TODD, University of Georgia, CPES, Tifton, GA 31793, and R.N. PITTMAN, USDA-ARS, Griffin, GA 30223.

11:00 (12) Resistance to Sclerotinia Blight in Peanut by Introduction of a Barley Oxalate Oxidase Gene. E.A. GRABAU*, J.L. HAMPTON, D.M. LIVINGSTONE, Department of Plant Pathology, Physiology and Weed Science, Virginia Tech, Blacksburg, Virginia 24061; D.E. PARTRIDGE, P.M. PHIPPS, Tidewater Agricultural Research and Extension Center, Suffolk, Virginia 23437.

11:15 (13) Microarray Analysis of Differentially Expressed Genes Involved in Resistance Responses to Late Leaf Spot Disease Caused by *Cercosporidium personatum* in Peanut. B.Z. GUO*, USDA-ARS, Crop protection and Management Research Unit, Tifton, GA 31793; M. LUO, D. LEE, Department of Crop and Soil Sciences, University of Georgia, Tifton, GA 31793; P. DANG, M.G. BAUSHER , USDA-ARS, U.S. Horticultural Research Laboratory, Ft. Pierce, FL 34945; and C.C. HOLBROOK, USDA-ARS, Crop Genetics and Breeding Research Unit, Tifton, GA 31793.

11:30 (14) Developing Peanut Cultivars with Genetic Resistance to Early Leafspot. S.P. TALLURY*, T.G. ISLEIB and H.T. STALKER. Department of Crop Science, North Carolina State University, Raleigh, NC 27695.

PLANT PATHOLOGY AND NEMATOLOGY I

Holley Ballroom IV

Moderator: Barbara Shew, North Carolina State University, Raleigh, NC

10:00 (15) Mapping of *Sclerotinia minor* Populations with Global Positioning Systems. J.E. HOLLOWELL*, D.L. SMITH, and B.B. SHEW. Dept. of Plant Pathology, NC State University, Raleigh, NC 27695.

10:15 (16) Management of Sclerotinia Blight with the Biological Control Agent *Coniothyrium minitans* and Its Sensitivity to Nine Pesticides Commonly Used in Peanut Production. D.E. PARTRIDGE*, T.B. SUTTON, Department of Plant Pathology, and D.L. JORDAN, Department of Crop Sciences, North Carolina State University, Raleigh, NC 27695.

10:30 (17) Yield Response of Selected Entries from Peanut Core Collection to Fungicide for Control of Sclerotinia Blight. J.P. DAMICONE* and W.D. SCRUGGS, Dept. of Entomology and Plant Pathology, Oklahoma State University, Stillwater, OK 74078; and C.C. HOLBROOK, USDA-ARS, Tifton, GA 31793.

10:45 (18) Screening Cultivars and Advanced Germplasm for Multiple Disease Resistance. T.B. BRENNEMAN1*, C.C. HOLBROOK2, and A.K. CULBREATH1. 1Department of Plant Pathology, University of Georgia, Tifton, GA 31794, and 2Crop Genetics and Breeding, USDA-ARS, Tifton, GA 31794.

11:00 (19) Utilization of Early-Planted Yield Test to Evaluate for TSWV-Resistance among Peanut Genotypes in Georgia. W.D. BRANCH*, Dept. of Crop and Soil Sciences, and T.B. BRENNEMAN and A.K. CULBREATH, Dept. of Plant Pathology, University of Georgia, Coastal Plain Experiment Station, Tifton, GA 31793.

11:15 (20) The Utility of Cultivar Selection and Cultural Practices for Managing Tomato Spotted Wilt Virus (TSWV) in Virginia-type Peanut. P.M. PHIPPS*, Tidewater Agricultural Research & Extension Center, Virginia Polytechnic Institute & State University, Suffolk, VA 23437.

11:30 (21) Spotted Wilt and Runner Peanut Canopy Characteristics. M.C. BLACK*, N.T. TROXCLAIR, M.R. BARING, A.M. SANCHEZ, and J.L. DAVIS. Texas A&M University, Texas Cooperative Extension, Uvalde, TX 78802 and Texas Agricultural Experiment Station, College Station, TX 77843.

11:45 (22) Effect of Phorate on the Incidence of Tomato Spotted Wilt Virus and Antioxidants in Peanut. N.P. SHAIKH*, G.E. MACDONALD, B.J. BRECKE, Agronomy Department, University of Florida, Gainesville, FL 32611; and M.B. ADJEI, 3401 Experiment Station Range Cattle Research Education Center, University of Florida, Ona, FL 33865.

WEDNESDAY AFTERNOON (1:15 pm – 3:00 pm)

GRADUATE STUDENT COMPETITION

Holley Ballroom IV

Moderator: Bob Kemerait, University of Georgia, Tifton, GA

1:15 (23) Using Hyper Spectral Imaging to Predict Peanut Pod Maturity. D. CARLEY*, D. JORDAN, and M. BURTON, Department of Crop Science, North Carolina State University, Raleigh, NC 27695; C. DHARMASRI, Syngenta Crop Protection, Greensboro, NC 27419; T. SUTTON, Department of Plant Pathology, North Carolina State University, Raleigh, NC 27695; and R. BRANDENBURG, Department of Entomology, North Carolina State University, Raleigh, NC 27695.

1:30 (24) Development and Utilization of a More Rapid Assessment Method to Identify Resistance to *Meloidogyne arenaria* in Peanut. W. DONG*, Department of Plant Pathology, The University of Georgia, Tifton, GA 31793; C.C. HOLBROOK, P. TIMPER, USDA-ARS, Coastal Plain Exp. Stn. Tifton, GA 31793; T. BRENNEMAN, Department of Plant Pathology, The University of Georgia, Tifton, GA 31793; and J.P. NOE, Department of Plant Pathology, The University of Georgia, Athens, GA 30602.

1:45 (25) Using Integrated Disease Management Data to Validate a Risk Index for Southern Stem Rot. J.E. WOODWARD*, T.B. BRENNEMAN, R.C. KEMERAIT, JR., and A.K. CULBREATH, Department of Plant Pathology, The University of Georgia Coastal Plain Experiment Station, Tifton, GA 31793.

2:00 (26) Durability of Leaf Spot Resistance in Advanced Peanut Breeding Lines in North and South America. S.K. GREMILLION*, A.K. CULBREATH, Dept. of Plant Pathology, University of Georgia, Tifton, GA, J.W. TODD, Dept. of Entomology, University of Georgia, Tifton, GA, D.W. GORBET, Agronomy Dept., University of Florida, Marianna, FL, and R. PITTMAN, USDA-ARS, Griffin, GA.

2:15 (27) Incidence of Southern Blight of Okrun Peanut Grown in Soil Previously Planted to *Sclerotium rolfsii*-infected Weeds and Peanut. C.B. MEADOR* and H.A. MELOUK. Department of Entomology and Plant Pathology and USDA-ARS. D.S. MURRAY. Department of Plant and Soil Science, Oklahoma State University, Stillwater, OK 74078.

2:30 (28) Evaluation of Alternating Application and Protective Properties of the Fungicides Fluazinam and Boscalid for Control of Sclerotinia Blight in North Carolina. D.L. SMITH*, J.E. HOLLOWELL, and B.B. SHEW. Department of Plant Pathology, NC State University, Raleigh, NC 27695.

2:45 (29) Temperature Effect During Seed Development on Oil and Seed Quality of Conventional and High-Oleate Large Seeded Virginia-Type Peanut. M.H. SUN*, J.F. SPEARS, T.G. ISLEIB, and D.L. JORDAN. Dept. of Crop Science, North Carolina State University, Raleigh, NC, 27695.

WEDNESDAY AFTERNOON (3:15 pm – 5:00 pm)

PROCESSING AND UTILIZATION / HARVESTING, CURING, SHELLING, STORING, HANDLING

Holley Ballroom I-III

Moderator: Russell Nuti, USDA-ARS, National Peanut Research Laboratory, Dawson, GA

3:15 (30) Use of Near Infrared Reflectance to Predict Sensory Quality of Peanuts. H.E. PATTEE*, T.G. ISLEIB, W.F. MCCLURE, F.G. GIESBRECHT, and T.H. SANDERS, Dept. of Biological and Agricultural Engineering, Dept. of Crop Science, Dept. of Statistics, North Carolina State University, Raleigh, NC 27695, and USDA-ARS Market Quality and Handling Research Unit, Raleigh, NC 27695.

3:30 (31) Value-added Nutraceuticals from Peanut Processing By-products. M. AHMEDNA*, J. YU, and I. GOKTEPE, Food and Nutritional Sciences, 161 Carver Hall, North Carolina A&T State University, Greensboro, NC 27411.

3:45 (32) Optimization of Physical Properties of Textured Peanut Patties using Binders. M.J. HINDS*, Nutritional Sciences Department, Oklahoma State University, Stillwater, OK 74078; M.N. RIAZ, Food Protein Research & Development Center, Texas A&M University, College Station, TX 77843; D. MOE, Food and Agricultural Products Research and Technology Center, Oklahoma State University, Stillwater, OK 74078.

4:00 (33) Enhancing the Value and Safety of Peanuts in Senegal. A. KANE*, Institut de Technologie Alimentaire, BP 2765, Hann, Dakar, Senegal; and M. AHMEDNA, Dept. of Human Environment & Family Sciences, 161 Carver Hall, North Carolina A&T State University Greensboro, NC 27411, USA.

4:15 (34) Nondestructive Moisture Content Determination in In-Shell Peanuts. C.V.K. KANDALA* and C.L. BUTTS, USDA, ARS, National Peanut Research Laboratory, Dawson, GA 39842.

4:30 (35) Effect of Bulk Handling on Peanut Seed Quality. C.L. BUTTS*, W.H. FAIRCLOTH, R.C. NUTI, D.L. ROWLAND, M.C. LAMB, USDA-ARS, National Peanut Research Laboratory, Dawson, GA 39842; and W.R. GUERKE, Georgia Department of Agriculture, Seed Laboratory, Tifton, GA 31793.

4:45 (36) Effect of Windrow Treatment on Peanut Pod Temperature and Flavor. T.H. SANDERS*, USDA-ARS, Market Quality and Handling Research Unit, 3127 Ligon Street, Raleigh, NC 27695.

ECONOMICS I

Holley Ballroom IV

Moderator: Curtis Jolly, Auburn University, Auburn, AL

3:15 (37) Yield and Economic Responses of Peanut to Crop Rotation Sequence. M.C. LAMB*, D.L. ROWLAND, R.B. SORENSEN, C.L. BUTTS, W.H. FAIRCLOTH, and R.C. NUTI. USDA-ARS, National Peanut Research Laboratory, Dawson, GA 39842.

3:30 (38) Economic Benefits of Crop Rotation. T.D. HEWITT*, Department of Food and Resource Economics, University of Florida - North Florida Research and Education Center, Marianna, FL 32446; and T.D. DAVIS, Department of Applied Economics and Statistics, Clemson University, Clemson, SC 29634.

3:45 (39) Should I Produce Peanuts without Irrigation? Simulating the Risks and Returns for Non-Irrigated and Irrigated Peanut Production in the Southeast. T.D. DAVIS*, Department of Applied Economics and Statistics, Clemson University, Clemson, SC 29634; and T.D. HEWITT, Department of Food and Resource Economics, University of Florida - North Florida Research and Education Center, Marianna, FL 32446.

4:00 (40) An Economic Evaluation of Irrigation Strategies for Peanut. N.B. SMITH*, Department of Agricultural and Applied Economics, The University of Georgia, Tifton, GA 31793; J.P. BEASLEY, JR, J.E. HOOK, and J.A. BALDWIN. Department of Crop and Soil Sciences, The University of Georgia, Tifton, GA 31793.

4:15 (41) Southeast Representative Peanut Buying Point Model: Analysis of Peanut Buying Points in Georgia, Florida and Alabama. A.S. LUKE-MORGAN*, A.E. MCCORVEY, Agricultural and Applied Economics Department, National Center for Peanut Competitiveness, The University of Georgia, Tifton, GA 31793; S.M. FLETCHER, Agricultural and Applied Economics Department, National Center for Peanut Competitiveness, The University of Georgia, Griffin, GA 30223.

4:30 42) Virginia-Carolina Representative Peanut Farms Established Through the National Center for Peanut Competitiveness. S.M. FLETCHER*, Agricultural and Applied Economics Department, National Center for Peanut Competitiveness, The University of Georgia, Griffin, GA 30223; A.E. MCCORVEY, A.S. LUKE-MORGAN, Agricultural and Applied Economics Department, National Center for Peanut Competitiveness, The University of Georgia, Tifton, GA 31793.

4:45 (43) Impact of Energy Costs on the Financial Viability of Southeast Representative Peanut Farms. A.E. MCCORVEY*, A.S. LUKE-MORGAN, Agricultural and Applied Economics Department, National Center for Peanut Competitiveness, The University of Georgia, Tifton, GA 31793; S.M. FLETCHER, Agricultural and Applied Economics Department, National Center for Peanut Competitiveness, The University of Georgia, Griffin, GA 30223.

BREEDING, BIOTECHNOLOGY, AND GENETICS II: VALUE ADDED TRAITS AND TOOLS FOR MANAGEMENT

Case Study Amphitheater

Moderator: Tom Isleib, North Carolina State University, Raleigh, NC

3:15 (44) Large Seeded Spanish Varieties as a Substitute for Runner-Type Peanuts in West Texas. M.R. BARING*, Soil and Crop Sciences Dept., Texas A&M University, College Station, TX 77843; M.D. BUROW, Y. LOPEZ, Texas Agricultural Experiment Station, Texas A&M University, Lubbock, TX 79403; C.E. SIMPSON, Texas Agricultural Experiment Station, Texas A&M University, Stephenville, TX 76401.

3:30 (45) Variation in Drought-Induced Protein Expression Among the Peanut Genotypes. S.M. BASHA*, R. KATAM, Division of Agricultural Sciences, Florida A&M University, Tallahassee, FL 32307; and K.S.S. NAIK, Agricultural Research Station, A.N.G.R. Agricultural University, Kadiri, 515591, India.

3:45 (46) Sources of Variability for Agronomic Traits of West Texas-Grown Peanuts. M.D. BUROW*, Y. LÓPEZ, J. AYERS, Texas Agricultural Experiment Station, Texas A&M University, Lubbock, TX 79403; C.E. SIMPSON, Texas Agricultural Experiment Station, Texas A&M University, Stephenville, TX 76401; A.M. SCHUBERT, Texas Agricultural Experiment Station, Texas A&M University, Lubbock, TX 79403; M.R. BARING, Department of Soil & Crop Sciences, Texas A&M University, College Station, TX 77843.

4:00 (47) Analysis of Expressed Sequence Tags for Peanut. M. GALLO-MEAGHER*, Agronomy Department, Plant Molecular and Cellular Biology Program, and The Genetics Institute, University of Florida, Gainesville, FL 32611; K. CHENGALRAYAN, Agronomy Department, University of Florida, Gainesville, FL 32611; W.G. FARMERIE, Interdisciplinary Center for Biotechnology Research, University of Florida, Gainesville, FL 32610; and S. MORRIS, Plant Molecular and Cellular Biology Program, University of Florida, Gainesville, FL 32611.

4:15 (48) Breeding Peanut with Resistance to Drought and Preharvest Aflatoxin Contamination. C.C. HOLBROOK*, B.Z. GUO, USDA-ARS, Tifton, GA; and D.M. WILSON, University of Georgia, Tifton, GA.

4:30 (49) Application of the CSM-CROPGRO-Peanut Model in Assisting with Multi-Location Evaluation and Yield Stability Analysis of Peanut Breeding Lines. B. SURIHARN*, A. PATANOTHAI, K. PANNANGPETCH, S. JOGLOY, Department of Agronomy, Faculty of Agriculture, Khon Kaen University, Khon Kaen 40002, Thailand; and G. HOOGENBOOM, Department of Biological and Agricultural Engineering, The University of Georgia, 1109 Experiment Street, Griffin, GA 30223.

4:45 50) Predicting Oleic and Linoleic Acid Content of Single Peanut Kernels using Near-Infrared Reflectance Spectroscopy. B.L. TILLMAN*, D.W. GORBET, University of Florida, North Florida Research and Education Center, 3925 Hwy. 71, Marianna, FL 32446, and G. PERSON, University of Florida, Agronomy Department, 2062 McCarty Hall, Gainesville, FL 32611.

THURSDAY MORNING (8:00 am – 10:15 am)

PLANT PATHOLOGY AND NEMATOLOGY II

Holley Ballroom IV

Moderator: Darcy Partridge, Virginia Tech, Suffolk, VA

8:00 (51) Development of Early Leaf Spot in Peanut Intercropped with Corn or Cotton. B.B. SHEW*, Department of Plant Pathology, North Carolina State University, Raleigh, NC 27695; M.A. BOUDREAU, Herbert Green Agroecology, Asheville, NC 28804; and J. ACKLAND, Imperial College London, Wye Campus, Ashford, Kent, UK.

8:15 (52) Relative Performance of Tebuconazole and Chlorothalonil for Control of Peanut Leaf Spot from 1994 through 2004. A.K. CULBREATH*, T.B. BRENNEMAN, R.C. KEMERAIT, and K.L. STEVENSON, Dept. of Plant Pathology, The University of Georgia, Tifton, GA 31793.

8:30 (53) Integration of Thiophanate Methyl Into Current Fungicide Programs in Georgia. R.C. KEMERAIT, JR.* and A.K. CULBREATH, Department of Plant Pathology, The University of Georgia, Tifton, GA 31794.

8:45 (54) Comparison of Abound 2SC Calendar and AU-Pnut Advisory Programs for the Control of Early Leaf Spot and Southern Stem Rot on a Disease Resistant Peanut Line. A.K. HAGAN*, H.L. CAMPBELL, and K.L. BOWEN, Dept. of Entomology and Plant Pathology, Auburn University, AL 36849; and L. WELLS, Wiregrass Research and Extension Center, Headland, AL 36345.

9:00 (55) Effect of Fungicide Treatment and Pod Maturity on Peanut Peg Strength. J.W. CHAPIN*, and J.S. THOMAS, Department of Entomology, Soils, and Plant Sciences, Clemson University, Edisto REC, 64 Research Road, Blackville, SC 29817.

9:15 (56) WITHDRAWN

9:30 (57) WITHDRAWN

9:45 (58) Fungal Diseases of Groundnut in Southern Ghana. E. MOSES*, J.K. TWUMASI, M. OWUSU-AKYAW, Plant Health Division, Crops Research Institute, P.O. Box 3785, Kumasi, Ghana; and R.L. BRANDENBURG, North Carolina State University, Raleigh, NC, USA.

10:00 (59) Plant Parasitic Nematodes Associated with Peanut Production in Southern Ghana. K. OSEI*, M. OWUSU-AKYAW, J.V.K. AFUN, J. ADU-MENSAH, F.O. ANNO-NYAKO, J.K. TWUMASI, E. MOSES, G. BOLFREY-ARKU, S. OSEI YEBOAH, M.B. MOCHIAH, and I. ADAMA, CSIR-Crops Research Institute, Box 3785, Kumasi, Ghana; R.L. BRANDENBURG and D. JORDAN, North Carolina State University, Raleigh, NC, 27695, USA.

WEED SCIENCE

Holley Ballroom I-III

Moderator: James Grichar, Texas Agricultural Experiment Station, Beeville, TX

8:00 (60) Uptake, Translocation, and Metabolism of Sulfentrazone in Peanut (*Arachis hypogaea* L.), Prickly Sida (*Sida spinosa*), and Pitted Morningglory (*Ipomoea lacunosa*). J.W. WILCUT*, W.E. THOMAS, S.C. TROXLER, L.R. FISHER, AND W.D. SMITH. North Carolina State University, Raleigh, NC.

8:15 (61) Peanut Response to AIM and ET. P.A. DOTRAY*, Texas Tech University, Texas Agricultural Experiment Station, and Texas Cooperative Extension, Lubbock, TX; T.A. BAUGHMAN, Texas Cooperative Extension, Vernon; and W.J. GRICHAR, Texas Agricultural Experiment Station, Beeville, TX.

8:30 (62) Carfentrazone for Peanut Weed Control. T.L. GREY* and E.P. PROSTKO. Department of Crop & Soil Sciences, The University of Georgia, Tifton, GA 31794.

8:45 (63) Texas Panicum Interference in Peanut and Implications for Treatment Decisions. W.C. JOHNSON, III*. USDA-ARS, Coastal Plain Experiment Station, Tifton, GA 31793.

9:00 (64) Influence of Planting Date on Peanut Response to Paraquat, 2,4-DB, and Plant Removal. D. JORDAN*, D. CARLEY, and D. JOHNSON, Department of Crop Science, North Carolina State University, Raleigh, NC 27695.

9:15 (65) Influence of Cadre on Georgia Green Yield and Seed Germination. E.P. PROSTKO* and T.L. GREY, Department of Crop & Soil Sciences, The University of Georgia, Tifton, GA 31793.

9:30 (66) On-Farm Comparisons of Alternative Scouting Methods in Peanut. B.L. ROBINSON*, J.M. MOFFITT, G.G. WILKERSON, D.L. JORDAN, A. COCHRAN, J.R. PEARCE, R.W. RHODES, B.L. SIMONDS, L.P. SMITH, L.W. SMITH, C.E. TYSON, S.N. UZZELL and F.C. WINSLOW, Department of Crop Science, North Carolina State University, Raleigh, NC 27695; North Carolina Cooperative Extension Service, Raleigh, NC 27695.

9:45 (67) Survey on Weed Management in Peanut Fields in Southern Ghana. G. BOLFREY-ARKU*, M. OWUSU-AKYAW, J.V.K. AFUN, J. ADU-MENSAH, F.O. ANNO-NYAKO, E. MOSES, K. OSEI, S. OSEI-YEBOAH, M.B. MOCHIAH, I. ADAMA, CSIR-Crops Research Institute, P. O. Box 3785, Kumasi, Ghana; and R.L. BRANDENBURG, D. JORDAN, North Carolina State University, USA.

EXTENSION TECHNIQUES AND TECHNOLOGY / EDUCATION FOR EXCELLENCE
(Sponsored by Bayer CropScience)

Case Study Amphitheater

Moderator: Richard Rudolph, Bayer CropScience

8:00 (68) Accuracy of Using Heat Units to Predict Peanut Pod Maturity During 2003 and 2004 in North Carolina. J. PEARCE*, North Carolina Cooperative Extension Service, Tarboro, NC 27886; D. JORDAN, P. JOHNSON, and D. CARLEY, Department of Crop Science, North Carolina State University, Raleigh, NC 27695; and J. ALSTON, D. CALLIS, and T. CORBETT, North Carolina Department of Agriculture and Consumer Services, Lewiston-Woodville, NC 27849.

8:15 (69) Peanut CRSP Technology Adoption Rates: Report on a Survey of North Carolina Peanut Farmers. M. WILLIAMS*, A. COCHRAN, C. ELLISON, J. PEARCE, R. RHODES, M. SHAW, B. SIMONDS, L. SMITH, P. SMITH, C. TYSON, S. UZZELL, A. WHITEHEAD, and F. WINSLOW, North Carolina Cooperative Extension Service, Raleigh, NC 27695; R. MOXLEY and G. THOMPSON, Department of Sociology and Anthropology, North Carolina State University, Raleigh, NC 27695; D. JORDAN and T. ISLEIB, Department of Crop Science, North Carolina State University, Raleigh, NC 27695; and R. BRANDENBURG, Department of Entomology, North Carolina State University, Raleigh, NC 27695.

8:30 (70) Validation of Current Calcium Recommendations on Peanuts. D.E. MCGRIFF*, Cooperative Extension Service, University of Georgia, Douglas, GA 31533, J.P. BEASLEY, J.A. BALDWIN, Department of Crop and Soil Sciences, University of Georgia, Tifton, GA 31793, E.J. WILLIAMS, Biological and Agricultural Engineering, University of Georgia, Tifton, GA 31793, F.J. CONNELLY, Cooperative Extension Service, University of Georgia, Nashville, GA 31639, and S. UTLEY, Cooperative Extension Service, University of Georgia, Ashburn, GA 31714.

8:45 (71) The Decline of Peanut Acreage in Southeast Virginia after the 2002 Farm Bill. G.R. SLADE*, Virginia Cooperative Extension, Surry, Virginia 23883.

9:00 (72) Fungicide Systems Effects on the Incidence of Peanut Disease. P.D. WIGLEY*, Calhoun County Extension Service, University of Georgia, Morgan, GA 39866; and R.C. KEMERAIT, Department of Plant Pathology, University of Georgia, Tifton, GA 31793.

9:15 (73) Challenges of Transitioning to Peanuts in a New Production Region of North Carolina. B. SPIVEY*, North Carolina Cooperative Extension Service, Jacksonville, NC; C. FOUNTAIN, North Carolina Cooperative Extension Service, Kenansville, NC; D. JORDAN, Department of Crop Science, North Carolina State University, Raleigh, NC 27695; R. BRANDENBURG, Department of Entomology, North Carolina State University, Raleigh, NC 27695; and B. SHEW, Department of Plant Pathology, North Carolina State University, Raleigh, NC 27695.

9:30 (74) Utilizing Varieties as a Tool in Peanut Disease Management. T.B. TANKERSLEY*, Tift County Extension Coordinator, The University of Georgia, Tifton, Georgia 31793; T.B. BRENNEMAN, The University of Georgia, Coastal Plain Experiment Station, Tifton, Georgia 31793; R.C. KEMERAIT, Department of Plant Pathology, The University of Georgia, Tifton, Georgia 31793; J.P. BEASLEY, JR, Department of Crop & Soil Science, The University of Georgia, Tifton, Georgia 31793 and J.A. BALDWIN, Department of Crop & Soil Science, The University of Georgia, Tifton, Georgia 31793.

9:45 (75) Efficacy of Three Levels of Disease Control in a New Peanut Production Area. C.W. DAVIS, Jr.*, Senior Extension Agent, Calhoun County, P. O Box 161 St. Mathews, SC 29135. J.W. CHAPIN, and J.S. THOMAS, Department of Entomology, Soils, and Plant Sciences, Clemson University, Edisto REC, 64 Research Road, Blackville, SC 29817.

10:00 (76) Soybean Thrips in Peanuts. B. EASTERLING*, Extension Agent-IPM, Texas Cooperative Extension, Pearsall, TX 78061; and N. TROXCLAIR, JR., Assistant Professor and Extension Entomologist, Texas Cooperative Extension-Research and Extension Center, Uvalde, TX, 78802.

THURSDAY MORNING (10:30 am – 12:00 pm)

BREEDING, BIOTECHNOLOGY, AND GENETICS III: GERMPLASM RESOURCES

Case Study Amphitheater

Moderator: Elizabeth Grabau, Virginia Tech, Blacksburg, VA

10:30 (77) WITHDRAWN

10:45 (78) Stability of Valencia Peanut Genotypes at New Mexico and West Texas. N. PUPPALA*, N. MANIVANNAN, New Mexico State University, Agricultural Science Center at Clovis, 2346 SR 288, Clovis, NM 88101 and S.G. DELIKOSTADINOV, Institute for Plant Genetic Resources, Sadovo, Bulgaria.

11:00 (79) Description Information on Eleven new *Arachis* Species. C.E. SIMPSON*, J.F.M. VALLS, A. KRAPOVICKAS, D.E. WILLIAMS, I.G. VARGAS, and R.F.A. VEIGA. Texas Agr. Exp. Stn., Texas A&M Univ., Stephenville, TX 76401; EMBRAPA/CENARGEN, Brasilia, Brazil; IBONE, Corrientes, Argentina; Foreign Agricultural Service, USDA, Washington, DC; Museo de Historia Natural Noel Kempff Mercado, Santa Cruz, Bolivia; IAC, Sao Paulo, Campinas, Brazil.

11:15 (80) Supporting Evidence of the Evolution of Cultivated Peanut through Crossability Studies involving *Arachis ipaënsis*, *A. duranensis,* and *A. hypogaea.* A.P. FAVERO*, C.E. SIMPSON, J.F.M. VALLS, and N.A. VELLO. Embrapa Genetic Resources and Biotechnology, SAIN Parque Estação Biológica, CP 02372, 70.770-900, Brasília, DF, Brazil; Texas Agric. Exp. Stn., Texas A&M Univ., Stephenville, TX 76401, USA, Department of Genetics - Escola Superior de Agricultura “Luiz de Queiroz” ESALQ/USP, C.P. 9, 13418-900, Piracicaba, SP, Brazil.

11:30 (81) Hybrids between *Arachis hypogaea* and *A. kretschmeri* from section *Procumbentes*. N. MALLIKARJUNA*, D. JADHAV and S. CHANDRA. International Crops Research Institute for Semi Arid Tropics, Patancheru 502 324, Andhra Pradesh, India.

11:45 (82) WITHDRAWN

ECONOMICS II

Holley Ballroom IV

Moderator: Marshall Lamb, USDA-ARS, National Peanut Research Laboratory, Dawson, GA

10:30 (83) The Economics of Aflatoxin Reduction in Benin Using Recommended Practices. D.S. VODOUHE*, University of the Republic of Benin, R. VODOUHE, International Institute of Tropical Agriculture, Benin, and C.M. JOLLY, Auburn University, Auburn, Alabama 36849.

10:45 (84) An Economic Analysis of Peanut Production Risk in Bulgaria. C.M. LIGEON*, Auburn University at Montgomery, N. BENCHEVA, Agricultural University in Podiv, Bulgaria, S. DELIKOSTADINOV, Institute of Plant Genetic Resources in Sadavo, Bulgaria, C.M. JOLLY, Auburn University, Auburn, Alabama, and N. PUPPALA, New Mexico State University.

11:00 (85) Socio-Economic Survey on Integrated Pest Management Practices on Peanut Production in Some Villages in the Ejura-Sekyedumase District of Ashanti Region, Ghana. A.A. DANKYI*, M. OWUSU-AKYAW, V.M. ANCHIRINAH, J. ADU-MENSAH, M.B. MOCHIAH, E. MOSES, J.V.K. AFUN, G. BOLFREY-ARKU, K. OSEI, S. OSEI-YEBOAH, I. ADAMA, CSIR-Crops Research Institute, P. O. Box 3785, Kumasi, Ghana; and R.L. BRANDENBURG, D. JORDAN, North Carolina State University, USA.

11:15 (86) Factors Influencing Decision to Sort Peanuts in Ghana. R.T. AWUAH*, S.C. FIALOR, Kwame Nkrumah University of Science and Technology, A.D. BINNS, Cahaba Safeguard Administrator (LLC), J.M. KAGOCHI and C.M. JOLLY, Auburn University, Auburn, Alabama, 36849.

11:30 (87) Groundnut Consumption Frequency Decisions in Ghana. C.M. JOLLY*, J.M. KAGOCHI, Auburn University, Auburn Alabama 36849, R.T. AWUAH, S.C. FIALOR, Kwame Nkrumah University of Science and Technology, and A.D. BINNS, Cahaba Safeguard Administrator (LLC).

MYCOTOXINS / PHYSIOLOGY AND SEED TECHNOLOGY

Holley Ballroom I-III

Moderator: David Jordan, North Carolina State University, Raleigh, NC

10:30 (88) Impact of Crop Rotation on Aflatoxin Contamination in Peanut. K.L. BOWEN*, A.K. HAGAN, and H.L. CAMPBELL. Dept. Entomology and Plant Pathology, Auburn University, AL 36849.

10:45 (89) Commercial Production and Use of Afla-Guard® for Biological Control of Aflatoxin Contamination in Peanuts. J.W. DORNER*, USDA-ARS, National Peanut Research Laboratory, Dawson, GA 39842.

11:00 (90) Determinants of Aflatoxin Levels and Health Effects in Ghana. P.E. JOLLY*, Y. JIANG, F. OBUSEH, Department of Epidemiology, University of Alabama at Birmingham, Birmingham, AL 35294; W.O. ELLIS, R. AWUAH, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana; J-S. WANG, Department of Environmental Toxicology, Texas Tech, Lubbock, TX 79409; T. PHILLIPS, College of Veterinary Medicine, Texas A&M, College Station, TX 77843; C. JOLLY, Department of Agricultural Economics and Rural Sociology, Auburn University, Auburn, AL 36849; and J. WILLIAMS, College of Agricultural and Environmental Sciences, University of Georgia, Griffin, GA 30223.

11:15 (91) Integrated Strategies to Address Aflatoxin Contamination of Peanut in Senegal. A. GUIRO, and KANE*, Institut de Technologie Alimentaire, BP 2765, Hann, Dakar, Sénégal.

11:30 (92) The Electrical Conductivity Test as a Measure of Seed Vigor for Large Seeded Virginia-Type Peanut. J.F. SPEARS*, M.H. SUN and T.G. ISLEIB. Dept. of Crop Science, North Carolina State University, Raleigh, NC 27695.

THURSDAY AFTERNOON (1:30 pm – 2:15 pm)

ENTOMOLOGY

Holley Ballroom I-III

Moderator: Ames Herbert, Virginia Tech, Suffolk, VA

1:30 (93) Comparison of Final TSWV Severity and Yield of Peanuts Treated with Acephate, Aldicarb, or Phorate Insecticide at Planting. J.W. TODD*, Entomology Department, The University of Georgia, Tifton, GA 31793; D.W. GORBET, Agronomy Department, The University of Florida, North Florida Research and Education Center, Marianna, FL 32446; A.K. CULBREATH, Plant Pathology Department, The University of Georgia, Tifton, GA 31793; and S.L. BROWN, Entomology Department, The University of Georgia, Tifton, GA 31793.

1:45 (94) Evaluation of Peanut Cultivars for Suitability in Pest Management Systems. J.R. WEEKS*, H.L. CAMPBELL, Dept of Entomology and Plant Pathology, Auburn University, AL 36849; L. WELLS, Alabama Agricultural Experiment Station, Wiregrass Research Extension Center, Headland, AL 36345; and M. PEGUES, Alabama Agricultural Experiment Station, Gulf Coast Research Extension Center, Fairhope, AL 36532.

2:00 (95) Survey on Soil Arthropods in Peanut Fields in Southern Ghana. M. OWUSU-AKYAW*, J.V.K. AFUN, J. ADU-MENSAH, F.O. ANNO-NYAKO, J.K. TWUMASI, E. MOSES, K. OSEI, G. BOLFREY-ARKU, S. OSEI-YEBOAH, M.B. MOCHIAH, I. ADAMA, CSIR-Crops Research Institute, P.O. Box 3785, Kumasi, Ghana; and R.L. BRANDENBURG, D. JORDAN, North Carolina State University, Raleigh, NC 27695, USA.

THURSDAY AFTERNOON (2:30 pm – 4:00 pm)

WORKSHOP
"STRIVING FOR EXCELLENCE IN PEANUT SCIENCE"

Holley Ballroom IV

Moderator: Michael Franke, Jr., J. Leek Associates, Inc., Brownfield, TX

2:30 Introduction ..... **Michael Franke**
J. Leek Associates, Brownfield, TX

2:35 A Historical Perspective ..... **Harold Pattee**
Retired, USDA-ARS, NC State University, Raleigh, NC

2:50 The Editor's Role ..... **Thomas Stalker**
Crop Science Dept., NC State University, Raleigh, NC

3:05 The Associate Editor/Reviewer ..... **Tim Brenneman**
Coastal Plain Exp. Stn., Tifton, GA

3:20 The Electronic Age ..... **Chris Butts**
National Peanut Laboratory, Dawson, GA

3:35 Open Discussion

Technical Sessions.....Thursday, July 14

POSTER SESSION I:
SETUP on Tuesday from 4:00 - 6:00 pm.
DISPLAY on Wednesday from 9:30 am - 3:30 pm.
***Authors will be present with papers from 10:00 am - 12:00 pm.**

WEDNESDAY

POSTER SESSION I

Holley Ballroom V-VII

Coordinator: Genny Padgett, Virginia Tech, Emporia, VA

(96) Peanut Soil Insect Pest Studies and Evaluation of Chlorpyrifos Management Options. D.A. HERBERT, JR.*, and S. MALONE, Department of Entomology, Virginia Tech, Tidewater Agricultural Research and Extension Center, Suffolk, VA 23437.

(97) Improved Management of Tomato Spotted Wilt Virus in the North Carolina and Virginia Peanut Areas: Evaluation of the Thrips Vectors, Their Seasonal Abundance, and Sensitivity to Insecticides. B.M. ROYALS*, R.L. BRANDENBURG, Department of Entomology, North Carolina State University, Box 7613, Raleigh, NC 27695, D.A. HERBERT, JR, Tidewater Ag Res. & Ext. Center, 6321 Holland Road, Suffolk, VA 23437, and D.L. JORDAN, Department of Crop Science, North Carolina State University, Box 7620, Raleigh, NC 27695.

(98) Using Nutrient Solutions to Trap the Almond Moth (Lepidoptera: Pyralidae) in a Peanut Shelling and Storage Facility. X. NI, and C.C. HOLBROOK*, USDA-ARS, Crop Genetics and Breeding Research Unit, Tifton, GA 31793.

(99) A New Chart Designed to Assist Peanut Growers to Make Decisions About Digging Peanut in the Virginia-Carolina Region of the United States. D. JOHNSON, D. JORDAN*, J. SPEARS, B. PENNY, B. SHEW, R. BRANDENBURG, and T. ISLEIB, North Carolina State University, Raleigh, NC 27695; J. FAIRCLOTH, P. PHIPPS, A. HERBERT, and D. COKER, Virginia Tech, Suffolk, VA 23437; and J. CHAPIN, Clemson University, Blackville, SC 29817.

(100) Factors Influencing Peanut Production in Bulgaria: Economic and Financial Analysis. N. BENCHEVA*1 C.M. LIGEON2, S. DELIKOSTADINOV3, C.M. JOLLY4 and N. PUPPALA5. Agricultural University in Podiv, Bulgaria1, Auburn University at Montgomery2 Institute of Plant Genetic Resources in Sadavo, Bulgaria3, Auburn University, Auburn, Alabama4, New Mexico State University5.

(101) Adjusting the Peanut Variety and Quality Evaluation Program to Reflect Acreage Shifts and Assess the Potential of Runner-types Grown in the Virginia-Carolina Region. D.L. COKER*, H.G. PITTMAN, and J.C. FAIRCLOTH, Department of Crop Soil and Environmental Sciences, Virginia Tech, Suffolk, VA 23437.

(102) Evaluation of Cultivated and Wild Peanuts for Tomato Spotted Wilt Virus Resistance. R.N. PITTMAN*, USDA-ARS, Plant Genetic Resources Conservation Unit, Griffin, GA 30223, J.W. TODD, A.K. CULBREATH, University of Georgia, CPES, Tifton, GA 31793 and D.W. GORBET, UFL, NFR&EC, Marianna, FL 32446.

(103) Genetic Variation in Molecular and Cellular Expression of Peanut Genotypes to Water Stress. R. KATAM, S.M. BASHA, and H.K.N. VASANTHAIAH, Division of Agricultural Sciences, Florida A&M University, Tallahassee, FL 32307.

(104) Identification and Characterization of Drought Induced Transcripts in Peanut. K.M. DEVAIAH*, GEETHABALI, Biotechnology Department, Bangalore University, Bangalore 560056, India; K.S.S. NAIK, ANGR Agricultural University, India; S.M. BASHA, Florida A&M University, Tallahassee, FL 32307.

(105) Utilization of the NMSU Peanut Varieties as a Germplasm in Bulgarian Valencia Peanut Breeding Program. S.G. DELIKOSTADINOV*, Institute of Plant Genetic Resources - 4122 Sadovo, Bulgaria, N. PUPPALA, Department of Agronomy and Horticulture, New Mexico State University, Las Cruces, NM 88101.

(106) Identification of Differentially Expressed Genes in Peanut in Response to *Aspergillus parasiticus* infection and Drought Stress. M. LUO, D. LEE, University of Georgia, Department of Crop and Soil Sciences, Tifton, GA 31793; X.Q. LIANG, Guangdong Academy of Agricultural Science, Crop Science Institute, Guangzhou, China; B.Z. GUO*, USDA-ARS, Crop Genetics and Breeding Research Unit, Tifton, GA 31793.

(107) Biochemical Responses of Peanut to Drought Stress and Their Role in Aflatoxin Contamination. M.S. ALAM*, B.L. CHOWDHURY, Bangladesh Agricultural University, Mymensingh, Bangladesh and S.M. BASHA, Florida A&M University, Tallahassee, Florida, USA.

(108) Identification of AFLP Markers Linked to Reduced Aflatoxin Accumulation in *A. cardenasii*-derived Germplasm Lines of Peanut. S.R. MILLA*, T.G. ISLEIB, S.P. TALLURY. Dept. of Crop Science, Box 7629, N.C. State Univ., Raleigh, NC 27695.

(109) B-1,3-Glucanase Activity in Peanut Seed and is Induced by Infection of *Aspergillus flavus*. X.Q. LIANG, Guangdong Academy of Agricultural Sciences, Institute of Crop Sciences, Guangzhou, China; B.Z. GUO*, USDA-ARS, Crop Protection and Management Research Unit, Tifton, GA 31793.; and C.C. HOLBROOK, USDA-ARS, Crop Genetics and Breeding Research Unit, Tifton, GA 31793.

POSTER SESSION II:
SETUP on Wednesday from 4:00 - 6:00 pm.
DISPLAY on Thursday from 10:00 am - 2:30 pm.
***Authors will be present with papers from 10:30 am - 12:00 pm.**

THURSDAY

POSTER SESSION II

Holley Ballroom V-VII

Coordinator: Rex Cotten, Virginia Tech, Suffolk, VA

(110) Impact of Calendar and Advisory Programs on the Control of Late Leaf Spot, Rust, and Southern Stem Rot of Peanut in a Dry-land Production System in Southwest Alabama. H.L. CAMPBELL*, A.K. HAGAN, and K.L. BOWEN, Dept. of Entomology and Plant Pathology, Auburn University, Auburn, AL 36849; and M.D. PEGUES, Gulf Coast Research and Extension Center, Fairhope, AL 36532.

(111) Preliminary Evaluation of Diseased and Non-Diseased Peanut Leaves Using Hyper Spectral Imaging. C. DHARMASRI, Syngenta Crop Protection, Greensboro, NC 27419; D. CARLEY*, D. JORDAN, and M. BURTON, Department of Crop Science, North Carolina State University, Raleigh, NC 27695; T. SUTTON, Department of Plant Pathology, North Carolina State University, Raleigh, NC 27695; and R. BRANDENBURG, Department of Entomology, North Carolina State University, Raleigh, NC 27695.

(112) Interference and Seedrain Dynamics of Jimsonweed (*Datura stramonium.* L) in Peanut (*Arachis hypogaea* L.). I.C. BURKE*, M.S. SCHROEDER, S.B. CLEWIS, W.J. EVERMAN, W.L. BARKER, W.E. THOMAS, and J.W. WILCUT. North Carolina State University, Raleigh, NC.

(113) Palmer amaranth (*Amaranthus palmeri*) Interference in Peanut (*Arachis hypogaea* L.). W.E. THOMAS*, M. SCHROEDER, I. C. BURKE, S.B. CLEWIS, W.J. EVERMAN, W.L. BARKER, and J.W. WILCUT. North Carolina State University, Raleigh, NC.

(114) Clearfield Corn Interference in Peanut (*Arachis hypogaea* L.). W.J. EVERMAN*, S.B. CLEWIS, I.C. BURKE, W.L. BARKER, and J.W. WILCUT. NC State University, Raleigh, NC.

(115) Weed Management in North Carolina Peanuts (*Arachis hypogaea* L.) with Diclosulam, Flumioxazin, and Sulfentrazone. S.B. CLEWIS*, D.L. JORDAN, W.J. EVERMAN, I.C. BURKE, W.E. THOMAS, W.L. BARKER, and J.W. WILCUT. North Carolina State University, Raleigh, NC.

(116) Using Reduced and Full Cadre and Pursuit Rates in Combination with Broadleaf Herbicides for Effective Weed Control. W.J. GRICHAR*, Texas Agricultural Experiment Station, Beeville, TX 78102; P.A. DOTRAY, Texas Agricultural Experiment Station, Lubbock, TX 79409 and T.A. BAUGHMAN, Texas Cooperative Extension, Vernon, TX 76384.

(117) Physiological Behavior of Ignite Drift on Non-Target Crops. W.L. BARKER*, W.E. THOMAS, S.B. CLEWIS, I.C. BURKE, W.J. EVERMAN, and J.W. WILCUT. North Carolina State University, Raleigh, NC.

(118) Reducing the Allergenic Properties of Peanut Extracts by Removing Peanut Allergens with Phytic Acids. S.Y. CHUNG*, E.T. CHAMPAGNE, USDA-ARS, SRRC, New Orleans, LA 70124.

(119) Peanut-based Texturized Meat Analogs: Formulation and Consumer Acceptability. D. REHRAH*, J. YU, M. AHMEDNA, and I. GOKTEPE, Department of Human Environment and Family Sciences, North Carolina A&T State University, Greensboro, NC 27411.

(120) Functional Properties and Potential Applications of Peanut Protein Isolate/Concentrate. J. YU, REHRAH, M. AHMEDNA, and I. GOKTEPE*, Dept. of Human Environment & Family Sciences, 161 Carver Hall, Greensboro, North Carolina A&T State University, Greensboro, NC 27411.

(121) Effect of Power Ultrasound on Oxidative Stability of Roasted Peanuts. P. WAMBURA, W. YANG*, L. WILLIAMS, Department of Food and Animal Sciences, Alabama A&M University, Normal, AL 35762; and F. McGEOVERN, Omnion, Inc., Rockland, MA 02370.

(122) Incorporating Bahiagrass Rotations into Peanut Cropping Systems in North Florida to Manage Peanut Diseases. F.K TSIGBEY*, J.J. MAROIS, D.L. WRIGHT, and T.W. KATSVAIRO. University of Florida, North Florida Research and Education Center, Quincy, FL 32351.

(123) Evaluation of the CSM-CROPGRO-Peanut Model for Predicting Growth and Development of Three Peanut Cultivars for Different Planting Dates in Thailand. P. BANTERNG*, G. HOOGENBOOM, Department of Biological and Agricultural Engineering, The University of Georgia, Griffin, Georgia 30223, USA; A. PATANOTHAI, Department of Agronomy, Faculty of Agriculture, Khon Kaen University, Khon Kaen 40002, Thailand; and P. SINGH, Soils and Agroclimatology Division, International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Patancheru, Andhra Pradesh 502 324, India.

(124) A Genetic Linkage Map of Cultivated Peanut (*Arachis hypogaea* L.) Based on AFLP and SSR Markers. G.H. HE*, G.Y. JIANG, C.S. PRAKASH, Department of Agricultural Sciences, Tuskegee University, AL 36088; M.V.C. GOWDA, Department of Genetics and Plant Breeding, University of Agricultural Sciences, Dharwad, India; and G.X. YI, Department of Agronomy, China Agriculture University, Beijing, China.

SITE SELECTION COMMITTEE REPORT

The Site Selection Committee met at the Portsmouth Renaissance from 12:30 – 1:30 on July 12. Five members were present; Fred Shokes (VA), Bob Kemerait (GA), Peter Dotray (TX), Austin Hagan and Kira Bowen (AL). It was noted that we had 562 room nights guaranteed at the Portsmouth Renaissance and exceeded this by approximately 20% with 780 room nights. A portion of this was attributed to the partnership with the National Peanut Board. Bob Kemerait reported that the meeting next year will be during the week of July 8-16 at the Hyatt-Regency Riverview in Savannah, Georgia. APRES has met at this site on two previous occasions and it has been a good meeting location. In 2007 we will be hosted by Alabama and the meeting site is yet to be determined. Austin Hagan reported that several sites were being investigated and some difficulty had been encountered getting a suitable hotel in July. Further investigations are underway and the site will be determined within the next two months. In 2008 members in Oklahoma will host the meeting. Oklahoma City was suggested as the site of choice since this location was very satisfactory the last time the meeting was held in Oklahoma.

Respectfully submitted by,
Fred Shokes, Chair

CAST REPORT

The Council for Agricultural Science and Technology (CAST) has a core membership of 36 scientific societies, of which APRES is one, that represent about 170,000 member scientists. CAST's broad base enhances the opportunities to represent agricultural and scientific research and knowledge in the public policy area. The following is a summary of activities over the past year.

The primary event that took place in CAST the past year was the selection of a new Executive Vice President (EVP). Dr. John Bonner was selected to serve as the new EVP effective July 1, 2005 following an exhaustive nationwide search. Dr. Bonner replaces Dr. Teresa Gruber who resigned effective December 1, 2004. Dr. Bonner came to CAST after 15 years with Land O'Lakes, most recently serving as Training and Marketing Manager and Eastern Sales Manager. Dr. Bonner received his Ph.D. from Iowa State University with a Nutrition Physiology major.

Dr. Richard Stuckey, former EVP of CAST from 1992 until 2001, served as Senior Advisor during the search for the new EVP.

CAST has had three new society members to join over the past year. The American Association of Pesticide Safety Educators (AAPSE), the Council of Entomology Department Administrators (CEDA), and the American Board of Veterinary Toxicology (ABVT) have all been accepted as members of CAST. Dr. Robert Wolfe of Kansas State University will serve as the representative for AAPSE, Dr. Z.B. Mayo will serve as the representative for CEDA, and Dr. William Edwards will serve as the representative for ABVT.

The 2004 Fall Board meeting of CAST was held in Oklahoma City, OK in

September. At the completion of the fall meeting Dr. Stanley Fletcher of the University of Georgia, and an APRES member, began serving a one-year term as President of CAST. The 2005 Spring Board meeting was held in Alexandria, VA. At the Spring Board meeting Dr. Norman Borlaug was presented the Charles A. Black Award. The Charles A. Black Award is presented annually to a food or agricultural scientist engaged actively in research who has made significant contributions to his/her scientific field, and who communicates the importance of this work and of food and agricultural science to the public, policymakers, and the news media.

The following publications were published by CAST in the past year:
Management of Pest Resistance: Strategies Using Crop Management, Biotechnology, and Pesticides
Animal Organ Donors: Human Health Applications
Bioenergy: Pointing to the Future
Metabolic Modifiers for Use in Animal Production

Respectfully submitted,
John Beasley

AD HOC COMMITTEE REPORT

Improving APRES Financial State

The Ad Hoc Committee on Improving APRES Financial State was appointed by President James Grichar to investigate the current and projected financial situation and make recommendations for improvement. Committee members were:

Chris Butts, Chair, USDA	James Hadden, Syngenta
Dan Gorbet, University of Florida	Richard Rudolph, Bayer CropScience
Marshall Lamb, USDA	Todd Baughman, Texas A&M
David Jordan, NC State University	Fred Shokes, Virginia Tech

The committee conducted business by two conference calls and by email correspondence. Minutes of the conference call meetings are available from APRES Administrative Assistant, Irene Nickels. Executive Officer, Ron Sholar, participated in both conference calls and *Peanut Science* Editor, Tom Stalker, participated in the second. The committee studied current dues structures, trends in membership, and the status of APRES publications. A final report was sent to the APRES Board of Directors on January 18, 2005 with the following recommendations.

1. Consolidate the administrative and editorial offices of the American Peanut Research and Education Society by:
    a. combining duties of the Executive Officer and *Peanut Science* Editor into a single position,
    b. combining duties of the Administrative and Editorial Assistants into a single position,
    c. consolidating the offices into a single location.
2. Move immediately to initiate electronic publishing of *Peanut Science*.

3. Refund 2003 subscription fees to institutional members and differential postage to international members due to non-delivery of the 2003 issue of *Peanut Science*. If *Peanut Science* is not delivered to members by June 01, 2005, then refund 2004 institutional memberships and differential postage.
4. Instruct the Finance Committee to evaluate the current dues structure and consider adding various levels of Sustaining Membership (Silver, Gold, Platinum) and Lifetime Membership based on actuary tables.
5. Instruct the Publications and Editorial Committee to resurrect the APRES newsletter in electronic format and improve the APRES website.
6. The Society should partner with other professional societies and/or industry associations to schedule joint or concurrent meetings.
7. The Board of Directors should act on these proposals prior to the 2005 Annual Meeting. If a vote of the membership is required, then develop ballots and conduct vote via mail or email.

Respectfully submitted by,
Christopher L. Butts, Chair

BY-LAWS
of the
AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY, INC.

ARTICLE I. NAME

Section 1. The name of this organization shall be "AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY, INC."

ARTICLE II. PURPOSE

Section 1. The purpose of this Society shall be to instruct and educate the public on the properties, production, and use of the peanut through the organization and promotion of public discussion groups, forums, lectures, and other programs or presentation to the interested public and to promote scientific research on the properties, production, and use of the peanut by providing forums, treatises, magazines, and other forms of educational material for the publication of scientific information and research papers on the peanut and the dissemination of such information to the interested public.

ARTICLE III. MEMBERSHIP

Section 1. The several classes of membership which shall be recognized are as follows:

a. Individual memberships: Individuals who pay dues at the full rate as fixed by the Board of Directors.

b. Institutional memberships: Libraries of industrial and educational groups or institutions and others that pay dues as fixed by the Board of Directors to receive the publications of the Society. Institutional members are not granted individual member rights.

c. Organizational memberships: Industrial or educational groups that pay dues as fixed by the Board of Directors. Organizational members may designate one representative who shall have individual member rights.

d. Sustaining memberships: Industrial organizations and others that pay dues as fixed by the Board of Directors. Sustaining members are those who wish to support this Society financially to an extent beyond minimum requirements as set forth in Section 1c, Article III.

   Sustaining members may designate one representative who shall have individual member rights. Also, any organization may hold sustaining memberships for any or all of its divisions or sections with individual member rights accorded each sustaining membership.

e. Student memberships: Full-time students who pay dues at a special rate as fixed by the Board of Directors. Persons presently enrolled as full-time students at any recognized college, university, or technical school are eligible for student membership. Post-doctoral students,

employed persons taking refresher courses or special employee training programs are not eligible for student memberships.

Section 2. Any member, participant, or representative duly serving on the Board of Directors or a committee of this Society and who is unable to attend any meeting of the Board or such committee may be temporarily replaced by an alternate selected by such member, participant, or representative upon appropriate written notice filed with the president or committee chairperson evidencing such designation or selection.

Section 3. All classes of membership may attend all meetings and participate in discussions. Only individual members or those with individual membership rights may vote and hold office. Members of all classes shall receive notification and purposes of meetings, and shall receive minutes of all Proceedings of the American Peanut Research and Education Society, Inc.

ARTICLE IV. DUES AND FEES

Section 1. The annual dues shall be determined by the Board of Directors with the advice of the Finance Committee subject to approval by the members at the annual business meeting.

Section 2. Dues are receivable on or before July 1 of the year for which the membership is held. Members in arrears on July 31 for the current year's dues shall be dropped from the rolls of this Society provided prior notification of such delinquency was given. Membership shall be reinstated for the current year upon payment of dues.

Section 3. A registration fee approved by the Board of Directors will be assessed at all regular meetings of the Society.

ARTICLE V. MEETINGS

Section 1. Annual meetings of the Society shall be held for the presentation of papers and/or discussion, and for the transaction of business. At least one general business session will be held during regular annual meetings at which reports from the executive officer and all standing committees will be given, and at which attention will be given to such other matters as the Board of Directors may designate. Opportunity shall be provided for discussion of these and other matters that members wish to have brought before the Board of Directors and/or general membership.

Section 2. Additional meetings may be called by the Board of Directors by two-thirds vote, or upon request of one-fourth of the members. The time and place shall be fixed by the Board of Directors.

Section 3. Any member may submit only one paper as senior author for consideration by the program chairperson of each annual meeting of the Society. Except for certain papers specifically invited by the Society president or program chairperson with the approval of the president, at least one author of any paper presented shall be a member of this Society.

Section 4. Special meetings in conjunction with the annual meeting by Society members, either alone or jointly with other groups, must be approved by the Board of Directors. Any request for the Society to underwrite obligations in connection with a proposed special meeting or project shall be submitted to the Board of Directors, who may obligate the Society as they deem advisable.

Section 5. The executive officer shall give all members written notice of all meetings not less than 60 days in advance of annual meetings and 30 days in advance of all other special meetings.

ARTICLE VI. QUORUM

Section 1. Forty voting members shall constitute a quorum for the transaction of business at the business meeting held during the annual meeting.

Section 2. For meetings of the Board of Directors and all committees, a majority of the members duly assigned to such board or committee shall constitute a quorum for the transaction of business.

ARTICLE VII. OFFICERS

Section 1. The officers of this Society shall consist of the president, the president-elect, the most recent available past-president and the executive officer of the Society, who may be appointed secretary and treasurer and given such other title as may be determined by the Board of Directors.

Section 2. The president and president-elect shall serve from the close of the annual meeting of this Society to the close of the next annual meeting. The president-elect shall automatically succeed to the presidency at the close of the annual meeting. If the president-elect should succeed to the presidency to complete an unexpired term, he/she shall then also serve as president for the following full term. In the event the president or president-elect, or both, should resign or become unable or unavailable to serve during their terms of office, the Board of Directors shall appoint a president, or both president-elect and president, to complete the unexpired terms until the next annual meeting when one or both offices, if necessary, will be filled by normal elective procedure. The most recent available past president shall serve as president until the Board of Directors can make such appointment.

Section 3. The officers and directors, with the exception of the executive officer, shall be elected by the members in attendance at the annual business meeting from nominees selected by the Nominating Committee or members nominated from the floor. The president, president-elect, and most recent available past-president shall serve without monetary compensation. The executive officer shall be appointed by a two-thirds majority vote of the Board of Directors.

Section 4. The executive officer may serve consecutive annual terms subject to appointment by the Board of Directors. The tenure of the executive officer may be discontinued by a two-thirds vote of the Board of Directors who then shall appoint a temporary executive officer to fill the unexpired term.

Section 5. The president shall arrange and preside at all meetings of the Board of Directors and with the advice, counsel, and assistance of the president-elect, and executive officer, and subject to consultation with the Board of Directors, shall carry on, transact, and supervise the interim affairs of the Society and provide leadership in the promotion of the objectives of this Society.

Section 6. The president-elect shall be program chairperson, responsible for development and coordination of the overall program of the education phase of the annual meeting.

Section 7. (a) The executive officer shall countersign all deeds, leases, and conveyances executed by the Society and affix the seal of the Society thereto and to such other papers as shall be required or directed to be sealed. (b) The executive officer shall keep a record of the deliberations of the Board of Directors, and keep safely and systematically all books, papers, records, and documents belonging to the Society, or in any wise pertaining to the business thereof. (c) The executive officer shall keep account of all monies, credits, debts, and property of any and every nature accrued and/or disbursed by this Society, and shall render such accounts, statements, and inventories of monies, debts, and property, as shall be required by the Board of Directors. (d) The executive officer shall prepare and distribute all notices and reports as directed in these By-Laws, and other information deemed necessary by the Board of Directors, to keep the membership well informed of the Society activities.

Section 8. The editor is responsible for timely publication and distribution of the Society's peer reviewed scientific journal, Peanut Science, in collaboration with the Publications and Editorial Committee.

Editorial responsibilities include:

1. Review performance of associate editors and reviewers. Recommend associate editors to the Publications and Editorial Committee as terms expire.
2. Conduct Associate Editors' meeting at least once per year. Associate Editors' meetings may be conducted in person at the Annual Meeting or via electronic means such as conference calls, web conferences, etc.
3. Establish standard electronic formats for manuscripts, tables, figures, and graphics in conjunction with Publications and Editorial Committee and publisher.
4. Supervise Administrative/Editorial assistant in:
    a. Preparing routine correspondence with authors to provide progress report of manuscripts.
    b. Preparing invoices and collecting page charges for accepted manuscripts.
5. Screen manuscript for content to determine the appropriate associate editor, and forward manuscript to appropriate associate editor.
6. Contact associate editors periodically to determine progress of manuscripts under review.

7. Receive reviewed and revised manuscripts from associate editor; review manuscript for grammar and formatting; resolve discrepancies in reviewers' and associate editor's acceptance decisions.

8. Correspond with author regarding decision to publish with instructions for final revisions or resubmission, as appropriate. Follow-up with authors of accepted manuscripts if final revisions have not been received within 30 days of notice of acceptance above.

9. Review final manuscripts for adherence to format requirements. If necessary, return the manuscript to the author for final format revisions.

10. Review final formatting and forward compiled articles to publisher for preparation of first run galley proofs.

11. Ensure timely progression of journal publication process including:

    a. Development and review of galley proofs of individual articles.

    b. Development and review of the journal proof (proof of all revised articles compiled in final publication format with tables of contents, page numbers, etc.)

    c. Final publication and distribution to members and subscribers via electronic format.

12. Evaluate journal publisher periodically; negotiate publication contract and resolve problems; set page charges and subscription rates for electronic formats with approval of the Board of Directors.

13. Provide widest distribution of *Peanut Science* possible by listing in various on-line catalogues and databases.

ARTICLE VIII. BOARD OF DIRECTORS

Section 1. The Board of Directors shall consist of the following:

a. The president
b. The most recent available past-president
c. The president-elect
d. Three State employees' representatives - these directors are those whose employment is state sponsored and whose relation to peanuts principally concerns research, and/or education, and/or regulatory pursuits. One director will be elected from each of the three main U.S. peanut producing areas.
e. United States Department of Agriculture representative - this director is one whose employment is directly sponsored by the USDA or one of its agencies, and whose relation to peanuts principally concerns research, and/or education, and/or regulatory pursuits.
f. Three Private Peanut Industry representatives - these directors are those whose employment is privately sponsored and whose principal activity with peanuts concerns: (1) the production of farmers' stock peanuts; (2) the shelling, marketing, and storage of raw peanuts; (3) the production or preparation of consumer food-stuffs or

manufactured products containing whole or parts of peanuts.

g. The President of the American Peanut Council or a representative of the President as designated by the American Peanut Council.
h. The Executive Officer - non-voting member of the Board of Directors who may be compensated for his services on a part-time or full-time salary stipulated by the Board of Directors in consultation with the Finance Committee.

Section 2. Terms of office for the directors' positions set forth in Section 1, paragraphs d, e, and f, shall be three years with elections to alternate from reference years as follows: d(VC area), e and f(2), 1992; d(SE area) and f(3), 1993; and d(SW area) and f(1), 1994.

Section 3. The Board of Directors shall determine the time and place of regular and special board meetings and may authorize or direct the president by majority vote to call special meetings whenever the functions, programs, and operations of the Society shall require special attention. All members of the Board of Directors shall be given at least 10 days advance notice of all meetings; except that in emergency cases, three days advance notice shall be sufficient.

Section 4. The Board of Directors will act as the legal representative of the Society when necessary and, as such, shall administer Society property and affairs. The Board of Directors shall be the final authority on these affairs in conformity with the By-Laws.

Section 5. The Board of Directors shall make and submit to this Society such recommendations, suggestions, functions, operation, and programs as may appear necessary, advisable, or worthwhile.

Section 6. Contingencies not provided for elsewhere in these By-Laws shall be handled by the Board of Directors in a manner they deem advisable.

Section 7. An Executive Committee comprised of the president, president-elect, most recent available past-president, and executive officer shall act for the Board of Directors between meetings of the Board, and on matters delegated to it by the Board. Its action shall be subject to ratification by the Board.

ARTICLE IX. COMMITTEES

Section 1. Members of the committees of the Society shall be appointed by the president and shall serve three-year terms unless otherwise stipulated. The president shall appoint a chairperson of each committee from among the incumbent committee members. The Board of Directors may, by a two-thirds vote, reject committee appointees. Appointments made to fill unexpected vacancies by incapacity of any committee member shall be only for the unexpired term of the incapacitated committee member. Unless otherwise specified in these By-Laws, any committee member may be re-appointed to succeed him/herself, and may serve on two or more committees concurrently but shall not chair more than one committee. Initially, one-third of the members of each committee will serve one-year terms, as designated by the president. The president shall announce the committees immediately upon assuming the office

at the annual business meeting. The new appointments take effect immediately upon announcement.

Section 2. Any or all members of any committee may be removed for cause by a two-thirds approval by the Board of Directors.

a. Finance Committee: This committee shall consist of six members, three representing State employees, one representing USDA, and two representing Private Business segments of the peanut industry. Appointments in all categories shall rotate among the three U.S. peanut production areas. This committee shall be responsible for preparation of the financial budget of the Society and for promoting sound fiscal policies within the Society. They shall direct the audit of all financial records of the Society annually, and make such recommendations as they deem necessary or as requested or directed by the Board of Directors. The term of the chairperson shall close with preparation of the budget for the following year, or with the close of the annual meeting at which a report is given on the work of the Finance Committee under his/her leadership, whichever is later.

b. Nominating Committee: This committee shall consist of four members appointed to one-year terms, one each representing State, USDA, and Private Business segments of the peanut industry with the most recent available past-president serving as chair. This committee shall nominate individual members to fill the positions as described and in the manner set forth in Articles VII and VIII of these By-Laws and shall convey their nominations to the president of this Society on or before the date of the annual meeting. The committee shall, insofar as possible, make nominations for the president-elect that will provide a balance among the various segments of the industry and a rotation among federal, state, and industry members. The willingness of any nominee to accept the responsibility of the position shall be ascertained by the committee (or members making nominations at the annual business meeting) prior to the election. No person may succeed him/herself as a member of this committee.

c. Publications and Editorial Committee: This committee shall consist of six members appointed to three-year terms, three representing State, one USDA, and two Private Business segments of the peanut industry with membership representing the three U.S. production areas. The members may be appointed to two consecutive three-year terms. This committee shall be responsible for the publication of Society-sponsored publications as authorized by the Board of Directors in consultation with the Finance Committee. This committee shall formulate and enforce the editorial policies for all publications of the Society subject to the directives from the Board of Directors.

d. Peanut Quality Committee: This committee shall consist of seven members, one each actively involved in research in peanuts--(1) varietal development, (2) production and marketing practices related to quality, and (3) physical and chemical properties related to quality--and one each representing the Grower, Sheller, Manufacturer, and Services

(pesticides and harvesting machinery in particular) segments of the peanut industry. This committee shall actively seek improvement in the quality of raw and processed peanuts and peanut products through promotion of mechanisms for the elucidation and solution of major problems and deficiencies.

e. Public Relations Committee: This committee shall consist of seven members, one each representing the State, USDA, Grower, Sheller, Manufacturer, and Services segments of the peanut industry, and a member from the host state who will serve a one-year term to coincide with the term of the president-elect. The primary purpose of this person will be to publicize the meeting and make photographic records of important events at the meeting. This committee shall provide leadership and direction for the Society in the following areas:

   (1) Membership: Development and implementation of mechanisms to create interest in the Society and increase its membership. These shall include, but not be limited to, preparing news releases for the home-town media of persons recognized at the meeting for significant achievements.
   (2) Cooperation: Advise the Board of Directors relative to the extent and type of cooperation and/or affiliation this Society should pursue and/or support with other organizations.
   (3) Necrology: Proper recognition of deceased members.
   (4) Resolutions: Proper recognition of special services provided by members and friends of the Society.

f. Bailey Award Committee: This committee shall consist of six members, with two new appointments each year, serving three-year terms. This committee shall be responsible for judging papers which are selected from each subject matter area. Initial screening for the award will be made by judges, selected in advance and having expertise in that particular area, who will listen to all papers in that subject matter area. This initial selection will be made on the basis of quality of presentation and content. Manuscripts of selected papers will be submitted to the committee by the author(s) and final selection will be made by the committee, based on the technical quality of the paper. The president, president-elect and executive officer shall be notified of the Award recipient at least sixty days prior to the annual meeting following the one at which the paper was presented. The president shall make the award at the annual meeting.

g. Fellows Committee: This committee shall consist of six members, two representing each of the three major geographic areas of U.S. peanut production with balance among State, USDA, and Private Business. Terms of office shall be for three years. Nominations shall be in accordance with procedures adopted by the Society and published in the previous year's PROCEEDINGS of APRES. From nominations received, the committee shall select qualified nominees for approval by majority vote of the Board of Directors.

h. Site Selection Committee: This committee shall consist of eight

members, each serving four-year terms. New appointments shall come from the state which will host the meeting four years following the meeting at which they are appointed. The chairperson of the committee shall be from the state which will host the meeting the next year and the vice-chairperson shall be from the state which will host the meeting the second year. The vice-chairperson will automatically move up to chairperson.

i. Coyt T. Wilson Distinguished Service Award Committee: This committee shall consist of six members, with two new appointments each year, serving three-year terms. Two committee members will be selected from each of the three main U.S. peanut producing areas. Nominations shall be in accordance with procedures adopted by the Society and published in the previous year's PROCEEDINGS of APRES. This committee shall review and rank nominations and submit these rankings to the committee chairperson. The nominee with the highest ranking shall be the recipient of the award. In the event of a tie, the committee will vote again, considering only the two tied individuals. Guidelines for nomination procedures and nominee qualifications shall be published in the Proceedings of the annual meeting. The president, president-elect, and executive officer shall be notified of the award recipient at least sixty days prior to the annual meeting. The president shall make the award at the annual meeting.

j. Joe Sugg Graduate Student Award Committee: This committee shall consist of five members. For the first appointment, three members are to serve a three-year term, and two members to serve a two-year term. Thereafter, all members shall serve a three-year term. Annually, the President shall appoint a Chair from among incumbent committee members. The primary function of this committee is to foster increased graduate student participation in presenting papers, to serve as a judging committee in the graduate students' session, and to identify the top two recipients (1st and 2nd place) of the Award. The Chair of the committee shall make the award presentation at the annual meeting.

ARTICLE X. DIVISIONS

Section 1. A Division within the Society may be created upon recommendation of the Board of Directors, or members may petition the Board of Directors for such status, by two-thirds vote of the general membership. Likewise, in a similar manner, a Division may be dissolved.

Section 2. Divisions may establish or dissolve Subdivision upon the approval of the Board of Directors.

Section 3. Division may make By-Laws for their own government, provided they are consistent with the rules and regulations of the Society, but no dues may be assessed. Divisions and Subdivisions may elect officers (chairperson, vice-chairperson, and a secretary) and appoint committees, provided the efforts thereof do not overlap or conflict with those of the officers and committees of the main body of the Society.

ARTICLE XI. AMENDMENTS

Section 1. These By-Laws may be amended consistent with the provision of the Articles of Incorporation by a two-thirds vote of all the eligible voting members present at any regular business meeting, provided such amendments shall be submitted in writing to each member of the Board of Directors at least thirty days before the meeting at which the action is to be taken.

Section 2. A By-Law or amendment to a By-Law shall take effect immediately upon its adoption, except that the Board of Directors may establish a transition schedule when it considers that the change may best be effected over a period of time. The amendment and transition schedule, if any, shall be published in the "Proceedings of APRES".

Amended at the Annual Meeting of the
American Peanut Research and Education Society
July 15, 2005, Portsmouth, Virginia

MEMBERSHIP (1975-2005)

	Individuals	Institutional	Organizational	Student	Sustaining	Total
1975	419	--	40	--	21	480
1976	363	45	45	--	30	483
1977	386	45	48	14	29	522
1978	383	54	50	21	32	540
1979	406	72	53	27	32	590
1980	386	63	58	27	33	567
1981	478	73	66	31	39	687
1982	470	81	65	24	36	676
1983	419	66	53	30	30	598
1984	421	58	52	33	31	595
1985	513	95	65	40	29	742
1986	455	102	66	27	27	677
1987	475	110	62	34	26	707
1988	455	93	59	35	27	669
1989	415	92	54	28	24	613
1990	416	85	47	29	21	598
1991	398	67	50	26	20	561
1992	399	71	40	28	17	555
1993	400	74	38	31	18	561
1994	377	76	43	25	14	535
1995	363	72	26	35	18	514
1996	336	69	24	25	18	472
1997	364	74	24	28	18	508
1998	367	62	27	26	14	496
1999	380	59	33	23	12	507
2000	334	52	28	23	11	448
2001	314	51	34	24	11	434
2002	294	47	29	34	11	415
2003	279	39	32	25	12	387
2004	285	43	21	19	11	379
2005	267	38	28	15	8	356

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